SOUTHERN CALIFORNIA ASSOCIATION OF MARINE INVERTEBRATE TAXONOMISTS

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Cnemidocarpa rhizopus (Redikorzev 1907)
Collected by City of San Diego in South Bay samples, 30m, sandy coarse sediments
Photo by M. Lilly

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The SCAMIT newsletter is not deemed to be a valid publication for formal taxonomic purposes

Publication Date: October 2023

16 MAY 2022, MISC PHYLA, LEADS M. LILLY & Z. SCOTT, ZOOM

Attendance: Brent Haggin, Don Cadien, Chase McDonald, Terra Petry, Wayne Dossett (LACSD); Megan Lilly, Zoë Scott, Wendy Enright, Lauren Valentino, Andy Davenport (CSD); Robin Gartman (CSD - Retired); Erin Oderlin, Greg Lyon, Jennifer Smolenski (CLAEMD); Ashley Loveland, Allison Fisher, Jessica Donald (SFPUC); Carol Paquette (MBC); Angelica Zavala Lopez (MTS); Matt Hill, Shay Hengen (EcoAnalysts); Mary Wicksten (TAMU).

UPCOMING MEETINGS

Visit the SCAMIT website at: www.scamit.org for the most current meetings announcements.

The business meeting opened with the announcement that the guest speakers for June and August have switched months. Now Tom Turner will be speaking in June on Sponges and Marie Nydam will be speaking in August on Ascidians.

Megan began the meeting reviewing the provisional voucher sheet for Pennatulacea sp HYP1 Smolenski & Lyon, 2018. CLAEMD has been routinely collecting this species from northern-central Santa Monica Bay since 2015 as both adults and juveniles and some of the ontogenetic changes have been reported on the voucher sheet. It can be found in silty to sandy sediment at depths of 50-70m. Those in attendance agreed that with minor edits to the voucher sheet, this species is ready for a SCAMIT designation and inclusion on the next SCAMIT list.

Megan continued the provisional species discussion with Lineidae sp B. She mentioned that the voucher sheet was originally published in SCAMIT newsletter 38(3) as the in-house provisional Lineidae sp HYP3. It was then published again in SCAMIT newsletter 39(4) with its SCAMIT designation Lineidae sp B. Megan was wondering how to avoid these types of double publications in the future. It was decided that occasionally this is unavoidable as the in-house designations are often published initially as part of a larger presentation on a particular phyla. When it gets its SCAMIT designation, it will be published again. For cases like Pennatulacea sp HYP1, it was only reviewed in the meeting. It will hopefully be fully SCAMITized before publication in the SCAMIT newsletter (complete with historical synonymies) and should avoid the problem of double publication.

A discussion ensued about adding a section in the newsletter dedicated to Provisional Species Review.

It was also decided that provisional species sheets to be reviewed at a meeting should be announced prior in the "next meeting topic" email blast.

Zoë continued the meeting by presenting an updated guide to the Sipuncula encountered in routine monitoring by the City of San Diego. The guide includes definitions of important terms used in the taxonomy of the Sipuncula, a table of characters associated with the defined terms, and tips on dissection techniques. Key terms defined were:

- Retractor muscles - Muscles connected to the body wall and introvert that are used to withdraw the introvert into the trunk region. Look for the number and arrangement or attachment points.

- Microvilli (or contractile villi) – Digitiform villi on the contractile vessel in the region of the intestines between the pharynx and descending loop. Look for presence/absence.
- Nephridia - Saclike organs in the anterior portion of the trunk used in the excretion of waste and as gonoducts. Look for the number of pairs and form (lobed or simple).
- Introvert - Retractable area of the body used for feeding and sensory perception. Look for length relative to trunk and the presence/absence of hooks or papillae.

Next, she went over recommendations for the dissection of Sipunculans:

1) Locate the ventral nerve chord and start cutting from the posterior (wider end) on the dorsal side (opposite of the ventral nerve chord). This way, you avoid cutting into any characters you will need to identify the animal.

2) To cut, use iris scissors and tent the skin to cut a window into the trunk. From there, cut anteriorly and pull up slightly on the lower scissor blade to minimize damage to the internal structures.

3) Cut to a point anterior of the nephridia.

4) Go slowly and be patient.

Wendy next presented an updated guide to the Echiura found during routine City of San Diego monitoring. The Echiuran guide also featured definitions of important terms, a table of characters, and tips on dissection. Key terms defined were:

- Anal vesicles - Pair of thin-walled hindgut sacs connected to the posterior digestive tract. May be simple or branched, and often have ciliated cups or funnels.
- Setae - Hooked or bristle-like structures present in the ventral body wall or encircling the anus.
- Longitudinal muscle bands - Thickening of the longitudinal muscles into extremely visible (although sometimes faint) bands.
- Nephridia - Saclike organs in the anterior portion of the trunk used for excretion and as gonoducts. Look for the number and form of associated structures (nephrostomal lips, nephridiopore, metanephridia).

Recommendations for the dissection of Echiurans:

1) Find the ventral nerve chord, start cutting from the posterior (wider end) on dorsal side (opposite of the ventral nerve chord). This way, you avoid cutting into any characters you will need to identify the animal.

2) To cut, use iris scissors and grasp the skin, make the first incision into the body wall and create a window. From there, cut anteriorly and pull up slightly on the lower scissor blade to minimize damage to the internal structures.

3) Cut from the anus to mouth, removing fecal pellets (Megan recommended using a pipette with ethanol to gently flush the fecal pellets from the animal's instestines) without tearing the anal sacs or nephridia. It may be necessary to move the animal to fresh ethanol periodically as the dish will fill with fecal pellets.

4) Go slowly and be patient.

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Don recommended that the local species of *Prometor* be added to the guide. *Prometor benthophila* Fisher, 1948 was described from off San Diego from a depth of 1,937m (1,059 fathoms) in green mud. *Prometor pocula* Hartman in Hartman & Barnard, 1960 was originally described from Long Basin, 68 miles southwest of San Clemente Island from a depth of 1,821m in stiff, silty clay. A provisional species, *Prometor* sp LA1, was erected by Don Cadien in 2003 for specimens found during LACSD monitoring, but the original material was damaged, and a voucher sheet was not created or distributed. The provisional species was found embedded in siltstone reefs between 100 and 300m. Additional material would be greatly appreciated. While the two described species are likely found deeper than we would sample, even during Bight surveys, their characteristics would help to point to the provisional species *Prometor* sp LA1 should it be encountered again.

Megan concluded the meeting by presenting her updated key to the Ascidians encountered by the City of San Diego during routine and Bight monitoring. The key is designed in a flow-chart format, rather than a dichotomous key, and includes digital images and the key characteristics at each junction. The key splits around the primary features of the branchial tentacles, the shape of the stigmata, and the location of the gonads. The current version will be circulated as a DRAFT and Megan will continue to work on updating the key with additional images and species.

She also shared images from a single sample with multiple sand-covered balls and urged caution when working with such samples. Superficially, they all look the same and the temptation to dissect only a few specimens and give them all the same name is high. After analysis, it was found that there were 3 different species in the sample, so it is important to dissect all of the specimens for accurate identification.

13 JUNE 2022, SPONGES, LEAD TOM TURNER, ZOOM

Attendance: Thomas Turner, Sienna McKim (UCSB); Brent Haggin, Don Cadien, Jovairia Loan, Chase McDonald, Wayne Dossett (LACSD); Kelvin Barwick, Ben Ferrarro (OCSD); Wendy Enright, Megan Lilly, Zoë Scott, Lauren Valentino (CSD); Robin Gartman (CSD-Retired); Craig Campbell (CLAEMD); Heather Peterson, Diane O'Donahue (SFPUC); Leslie Harris, Lindsey Groves, Kathy Omura (NHMLAC); Tony Phillips, Dean Pasko (DCE); Angelica Zavala-Lopez (MTS); Carol Paquette (MBC); Marie Nydam (Soka University); Constance Gramlich (SDSU); Mary Wicksten (TAMU); Omar Ojeda (Universidad Nacional Autónoma de Mexico); Bryce Perog (former student of Marie Nydam and Thomas Turner & former OCSD intern); Erica Keppel, Smithsonian; Jessica Goodheart (affiliation unknown)

We had two guest speakers for the day - Thomas Turner (UC, Santa Barbara) to discuss sponges and an addition of Omar Ojeda (Universidad Nacional Autónoma de Mexico) to talk about Eulimids.

We started with Tom's presentation on Sponges which he'd broken into two parts: Part 1 - Practical Identification and Biodiversity of Local Sponges and Part 2 - Sponge Taxonomy.

Tom provided a link to a YouTube video on "how to make a sponge spicule prep" (Smithsonian Tropical Research Institute YouTube Page) by Dr. Bob Thacker - Professor, Ecology & Evolution; Stony Brook University. youtube.be/cxGitjU7X5I.

He then covered his history with sponges and his current work. His talk was interactive, and he stopped frequently to ask for questions and comments. He is delving deeper into morphology and

DNA but is having difficulty sequencing specimens from older collections. Sponges appear to be even more difficult than other phyla to sequence after a bit of time and wondered if it might have to do with the sponges' unique biochemistry. He thinks there are probably about 200 species in the subtidal although previously only about 100 species have been listed. On that note, he stated that the biggest problem in using Lee's key (Lee et al 2007) is that a huge number of species aren't included. One of his goals is to update the key to the sponges of CA and to create a field guide; there are some species that can be identified from photos/ morphology.

With regard to literature he recommended, A Guide to the Classification of Sponges (Hooper, J. et al. 2002) as a good resource. He did give a warning, however, that it is difficult to use as morphology is limited and the keys can be frustrating; there are many terms like "sometimes" and "always".

Additionally confounding is that genetic research is providing dramatically different results. Morrow and Cardenas 2015 changed things, and it is now difficult to match up DNA results with morphology results. There is the possibility for epibiont contamination in DNA work on sponges or even cross-contamination between species since they often grow on each other.

Tom then went on to discuss spicule mounts. It is not uncommon to get "malformed" spicules, for instance many diacts may be present and then you will find a monact; use caution as it could be just a malformed diact. Also, since they develop over time, small, thin spicules can actually be new ones forming.

Sponges can take up spicules from the environment and accordingly, some species don't even make their spicules, rather, they use broken ones from the environment. They uptake sand and use spicule bits.

Getting into more specifics, *Halichondria* and *Haliclona* have very different skeletal structures which is a good way to tell them apart. But how to clear sections to see skeletal structure more easily is another matter. Tom uses proteinase K or dehydrates sections in ethanol and then uses histoclear. Soft sponges can be frozen and thin-sliced. As with all sponge characters there was a note of caution regarding skeletal structure - the hydrodynamics of an environment can modify skeletal structure.

Halichondria panicea (Pallas, 1766) and 2 other sibling species, *H. hygieia* (type A and type B) are all genetically separate but are not morphologically distinct.

Halichondria bowerbanki Burton, 1930 – supposed to be in marinas, however true *H. bowerbanki* is only in one marina and other specimens found so far have mostly been subtidal. However, other species look just like *H. bowerbanki* but are genetically distinct.

He took a moment to warn us that there are many introduced species in marinas which is not surprising.

Tom wonders if exposure to air inhibits the ability to get good DNA samples as sponges start to digest themselves. For this reason some samples are better in formalin, than in those species without spicules. If the skeletal structure needs to be examined, formalin is the way to go.

Tom has been working on converting the Lee et al. (2007) key into a database. In this way he can filter for characters and has removed the dichotomy. He may eventually make it public.

Publication Date: October 2023

He then reviewed his draft of a preliminary picture "key" to the sponges of the Santa Barbara channel. He is creating it to help student divers conduct surveys. Sponges can "relax" while filtering but other times they can contract/harden which subsequently affects their appearance.

Megan showed images of the very common undescribed species of *Suberites* from SD Bay and occasionally their shallow South Bay trawls. Tom asked for ethanol-preserved tissue.

Leslie then thanked Tom for his great presentation on California marine sponges. The meeting was recorded and will be available for download. She also wanted to mention that Tom's three recent papers on local sponge systematics can be found on his lab website: https://turner.eemb.ucsb.edu/publications

Thankfully his two Zootaxa papers are open-access.

Our next speaker took a turn to another phyla. Omar Ojeda is a graduate student at the Universidad Nacional Autónoma de Mexico. He won a student award that allowed him to work at NHMLAC researching tropical Pacific Eulimids.

Excerpts from his presentation are below:

Eulimids are parasites on echinoderms; there is even a species that is an internal parasite and is highly modified and shell-less.

Currently there are 105 species (but it should be noted that not all are correct). The majority (> 60%) of described species are found in the tropical Panamic region with the most common genus being *Melanella*. They are not the most abundant group but they are usually always present.

The various morphometric features used in identification are:

- Shell outline
- Convexity of the whorls
- Proportions of the whorls
- Protoconch
- Aperture shape
- Outer lip

Kelvin asked about curvature of shell and if it is distinctive, as Warén 2008 had questioned this feature. Omar replied that the curvature of the shell is not necessarily of taxonomic relevance. It could be related to growth stage.

Wendy wondered if the species are host-specific or if they are opportunistic. Omar said that the species can be specific to a certain point, as in each genus associates with a certain class of echinoderms. Among these genera further specificity can arise, with some being restricted to certain families within a class, but other genera, like *Melanella*, can be found on almost any sea cucumber.

Brent asked if the species modified as internal parasites have a normal external morphology before parasitizing a host. Omar noted that the larvae have a shell but once they become an internal parasite they change. This is an assumption, and it has not been well studied.

20 JUNE 2022, SCAMIT SLRC, ZOOM

Attendance: Brent Haggin, Jovairia Loan, Don Cadien (LACSD); Wendy Enright, Ricardo Martinez-Lara, Veronica Rodriquez, Zoë Scott, Megan Lilly, Andrew Davenport, Katie Beauchamp (CSD); Kelvin Barwick, Ben Ferraro (OCSD).

Kelvin started by overviewing taxa assignments. He apologized for not yet completing a draft RFP for the database project.

Kelvin asked attendees if the match/not match list generated from Worms was useful. Wendy said yes. Veronica agreed and said she always starts with the match/not match list and finds value in it. Kelvin asked if it was worth his time and effort to do that for all the groups. Zoë let us know that she had created an R code that simplifies the Worms output and is willing to share. Kelvin asked for a separate meeting to discuss the R code options and to set up a workflow.

We reviewed the proposed schedule and changed the emends submittal deadline to 15 May 2023. Brent and others would like to see Ed 14 available for B'23. This led to some discussion regarding the difficulty of updating agency lists in a short time frame, so June 1st became the new deadline for the entire list to be reassembled and sent to the editors for review.

Next, we moved on to the provisional species sheet review and the associated database. Taxa leads need to check the database and decide about whether to retain or remove the provisional species from the Species List. If they decide to remove any species, they must provide a list of taxa removed for insufficient material which will be added to the front matter. At this point, Brent suggested an appendix that lists species removed rather than adding to the front matter. Wendy and Don both voted for an appendix versus adding to the front matter. Don wanted to make sure we could discuss the reasoning for removal. He suggested creating a key to removal reasons and then "key" the species in the appendix. New guidelines were developed - if recommending removal of a species be sure to explain why in the emend file. The species will move to the hold list and not be deleted entirely. In the hold list describe your justification for removal and then the editors will create a key to removal justifications.

Kelvin then moved on to the new voucher sheet guidelines document and asked for any comments or questions. We reviewed the document as a group. Kelvin added a caveat for new species proposals that gives editors 1st right of refusal for any new taxa. Brent noted that at least some editors should be at any meeting and can give feedback. A discussion about DCE provisionals arose as they use different naming conventions – DCE/locale/agency. Don stated that DCE doesn't need to standardize their in-house naming conventions because SCAMIT can only dictate convention for SCAMIT provisionals, not in-house provisionals.

Don suggested adding a note to include the size of the specimen being described and, if aware, of adult and juv sizes of the species. Any ecological information is also a good addition.

To avoid double-publishing a species, first as an in-house provisional and then again as a SCAMIT provisional, it was decided that a provisional species sheet should only be published in a newsletter once it receives a SCAMIT designation. As an in-house provisional it can be discussed in the minutes and the sheet can be accessed on the wixi site.

Cody is working on the wixi site to add a way to hide columns as "true" so that eventually those provisional species that have been through the whole review process will show as approved and ready to be added to the next edition of the Species List.

8 AUGUST 2022, ASCIDIANS, MARIE NYDAM, ZOOM

Attendance: Marie Nydam, SOKA University; Gretchen Lambert, retired; Don Cadien, LACSD; Greg Lyons, Erin Oderlin, Jennifer Smolenski, CLAEMD; Constance Gramlich, SDSU; Dean Pasko, Tony Phillips, DCE; Mary Wicksten, TAMU; Kelvin Barwick, OCSD; Zoë Scott, Lauren Valentino, Wendy Enright, Megan Lilly, CSD; Kathy Omura, NHMLAC; Tom Turner, UCSB; Quang Pham, affiliation unknown.

The day started with Kelvin telling us he met the authors of the latest edition of the Behrens nudibranch book at the recent WSM meeting. He gave a short presentation previewing this latest edition. Some updates include, a few more pictures per species and the name changes since the 2005 volume. Kelvin was a little disappointed that there were no radular formulas given, but no one else shared in his disappointment. There is a somewhat limited reference section and it is printed on non-glossy paper and bound a bit weaker so Kelvin doubted its ability to stand up well in the field. but overall he recommended it. As far as he knows there is no electronic copy available. It can be ordered on molamarine.com for $40.

Mary Wicksten had the floor briefly to note that California Fish and Game are asking for any citings of Black Abalone. Please contact Mary if you see any and note where and when they were observed. You can email Mary at: wicksten@bio.tamu.edu.

Marie Nydam then took the floor for the main topic of the day, ascidians. Marie is a professor at Soka University in Aliso Viejo, CA. It is a small liberal arts college and is supportive of marine research. Marie has been focused on ascidians for her entire career.

She started by giving a comprehensive overview of ascidian biology and physiology. With regards to taxonomy she gave us some helpful pointers. In the field solitary phlebobranchs can be separated from solitary stolidobranchs by the number of folds in the siphon; phlebobranchs have 6+ folds on both siphons and for stolidobranchs the incurrent siphon has 4-6 folds and the excurrent siphon has only 4 folds.

Colonial ascidians are more difficult to sort out in the field as usually both siphons can't be seen, however as a general rule, aplousobranchs share a common tunic except for *Clavalina*. Colonial aplousobranchs will have 2 or 3 body sections.

In contrast colonial phlebobranchs don't share a common tunic but are inter-connected by stolons. They have a single body section and the gonads are attached to the intestine.

Colonial stolidobranchs are embedded in a common tunic but have only 1 body section and the gonads are attached to the body wall. The only colonial stolidobranchs are in the Family Styelidae.

What has historically been identified as *Ciona intestinalis* (Linnaeus, 1767) in the SCB has turned out to be *C. robusta* Hoshino & Tokioka, 1967. Gretchen doesn't know why *C. intestinalis* isn't found in the SCB as it is widespread on the East Coast and Europe.

Some helpful taxonomic notes:

- In the branchial sac longitudinal vessels run anterior to posterior, while transverse vessels run left to right/dorsal to ventral.

- Molgulids have a renal sac on the right side of the body. One theory is that the renal sac might allow molgulids to live in lower salinity habitats. Gretchen said that *Molgula manhattensis* (De Kay, 1843) is very common in San Francisco Bay and can survive very low salinities.
- *Molgula ficus* (Macdonald, 1859) and *Molgula verrucifera* Ritter & Forsyth, 1917 have 7 branchial folds per side, whereas *M. manhattensis* has only 6.
- *Molgula verrucifera* is native to the Southern California Bight and tiny, being usually 1 cm or less and is found offshore.
- If the branchial sac has 4 folds it either a Pyuridae or Styelidae
- There are two species of *Boltenia*: *B. echinata* (Linnaeus, 1767) which has no stalk and *B. villosa* (Stimpson, 1864) which has a stalk.
- The similar-looking "spiny" ascidians, *Halocynthi* and *Boltenia* can be separated by the character of the tunic spines. In *Halocynthia igaboja* Oka, 1906 the tunic spines are **not** branched at the tips whereas in *Boltenia echinata* the tunic spines are branched at the tips.
- Hematoxylin stain is great for ascidians and can be ordered from Fisher Scientific.
- *Microcosmus squamiger* Michaelsen, 1927 is the only *Microcosmus* sp found on docks. It is a deep purple in life.

NOTES ON BATHYAL PLATYISCHNOPIDAE

D. B. Cadien, 20 August 2023

Ortiz and Winfield 2023 recently described a new *Tiburonella* from the bathyal Gulf of Mexico. Their species, *T. minima*, is based on a single very small female which may not be mature. However, the fact that their animal was taken from a depth of 2321m in the Bay of Campeche off the northern coast of the Yucatan Peninsula is significant. This represents the first report of any member of the family Platyischnopidae in the world occurring below the nominal shelf-break depth of 200m. It also represents the deepest record of the genus *Tiburonella* by a very considerable margin.

Previous records of *Tiburonella* ranged down to 30m (although Chiesa and Alonso 2014 report the genus to 127m), but is typically much shallower, with many species associated with seagrass beds. The family contains ten genera, only one of which has been taken at depths exceeding 100m. This is *Skaptopus* Thomas and Barnard 1983, found in outer shelf depths of 129-175m off the US East Coast. The genus is monotypic at present, as are several other Platyischnopid genera. Collections in recent years in the Gulf of Mexico and off Angola have, however, provided additional material of *Skaptopus* from bathyal oil exploration areas. Two specimens were taken from the NW Gulf within the Cinturon Plegado Perdido exploration block in 2017, one at 780m, one at 842m. This has been designated *Skaptopus* GOM1 and can be separated from *S. brychius* by having the merus of P6 bearing a large subquadrate posterior flange absent in the type species, as well as details of the antennae and gnathopods. These two specimens represent both sexes. The male antenna 1 configuration (enlarged art 3, effuse long setation of setal brush) are the same in the two taxa. The accessory flagellum is biarticulated in both, with the distal article much longer in *S. brychius* than in *S.* sp GOM1.

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A second species was taken in 2021 in oil exploration of Block 15 in the Gulf of Guinea off Angola, designated *Skaptopus* WA 1. Two specimens were also taken there, one at 745m, and one at 765m. This species can be separated from the two the western Atlantic species, by having large teeth posteriorly on the basis of P7 absent in both of the others. In all three cases the anterior coxae are acuminate, overlap, and diminish in size from an enlarged Coxa 4 to Coxa 1. Members of *Indoischnopus* share this character, but the latter genus has a ventral head keel lacking in the former, and only has teeth dorsally on the posterior margin of Pleonite 3. The only currently recognized genus in the family without a ventral head keel is *Skaptopus*. As pointed out by Chiesa and Alonso (2014) it is also the only genus in the family with pleonites 1-3 having dorsally toothed posterior borders, a character shared by *S. brychius* and both undescribed forms.

Thus, members of the family have penetrated into the deeper waters of the Atlantic on at least three occasions, once reaching lower bathyal depths. As these records involve three species in two genera, it is likely that additional deeper-dwelling members of existing genera will be detected in the future, and new genera remain a distinct possibility as two new ones have been described within the last decade (Chiesa and Alonso 2014, Perez-Schultheiss 2017).

Cadien References:

Chiesa, I. L. and G. M. Alonso de Pina (2014). "A new genus and species of Platyischnopidae (Amphipoda: Gammaridea) from the Argentine Sea, South-West Atlantic Ocean." Zootaxa 3811 (1): 34-52.

Ortiz, M. and I. Winfield (2023). "First record of the genus *Tiburonella* Thomas & Barnard 1983 (Amphipoda, Platyischnopidae) from the deep-sea Gulf of Mexico, with the description of a new species." Gulf and Caribbean Research 34: 13-17.

Pérez-Schultheiss, J. (2017). *Ensigeropus,* a new genus of the family Platyischnopidae (Amphipoda: Amphilochidea) from Northern Chile. Zootaxa. 4311(3): 399-408.

Thomas, J. D. and J. L. Barnard (1983). "The Platyischnopidae of America (Crustacea: Amphipoda)." Smithsonian Contributions to Zoology (375): 1-33.

POLYCHAETE VOUCHER SHEETS

Attached you will find 4 additional polychaete provisional species voucher sheets authored by Brent Haggin. These species have all now been fully "SCAMITized" and are included in Ed 14 of the Species List.

LITERATURE CITED

Bouchet, P. & Warén, A. 1986. Revision of the Northeast Atlantic bathyal and abyssal Aclididae Eulimidae, Epitonidae (Mollusca, Gastropoda). Bollettino Malacologico. suppl. 2: 297-576

Fisher, W. K. 1948. A review of the Bonelliidae (Echiuroidea). Annals and magazine of Natural History (Series 11) 14 (120): 852–860.

Fisher, W. K. 1949. Additions to the echiuroid fauna of the North Pacific Ocean. Proceedings of the United States National Museum 99(3248): 479–497, plates 28–34.

Hartman, O. 1960. Systematic account of some marine invertebrate animals from the deep basins off southern California. Allan Hancock Pacific Expeditions 22(2): 69-216, plates 1-19.

Hooper, J., van Soest, R. 2002. Systema Porifera: A Guide to the Classification of Sponges (Two Vol. Set). Kluwer Academic/Plenum Publishers, New York.

Lee, W.L., Elvin, D., Reiswig, H. 2007. A guide and Key to the Marine Sponges of California. Published by: The Monterey Bay Sanctuary Foundation. 130 pp.

Morrow, C., Cárdenas, P. Proposal for a revised classification of the Demospongiae (Porifera). Front Zool 12, 7 (2015).

Warén, Anders. 2008. Descriptions of New Taxa of Eulimidae (Mollusca, Prosobranchia), with Notes on Some Previously Described Genera. Zoologica Scripta. Vol 9. Pp: 283 – 306.

Please visit the SCAMIT Website at: www.scamit.org

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Voucher Sheet

B. Haggin
April, 2023

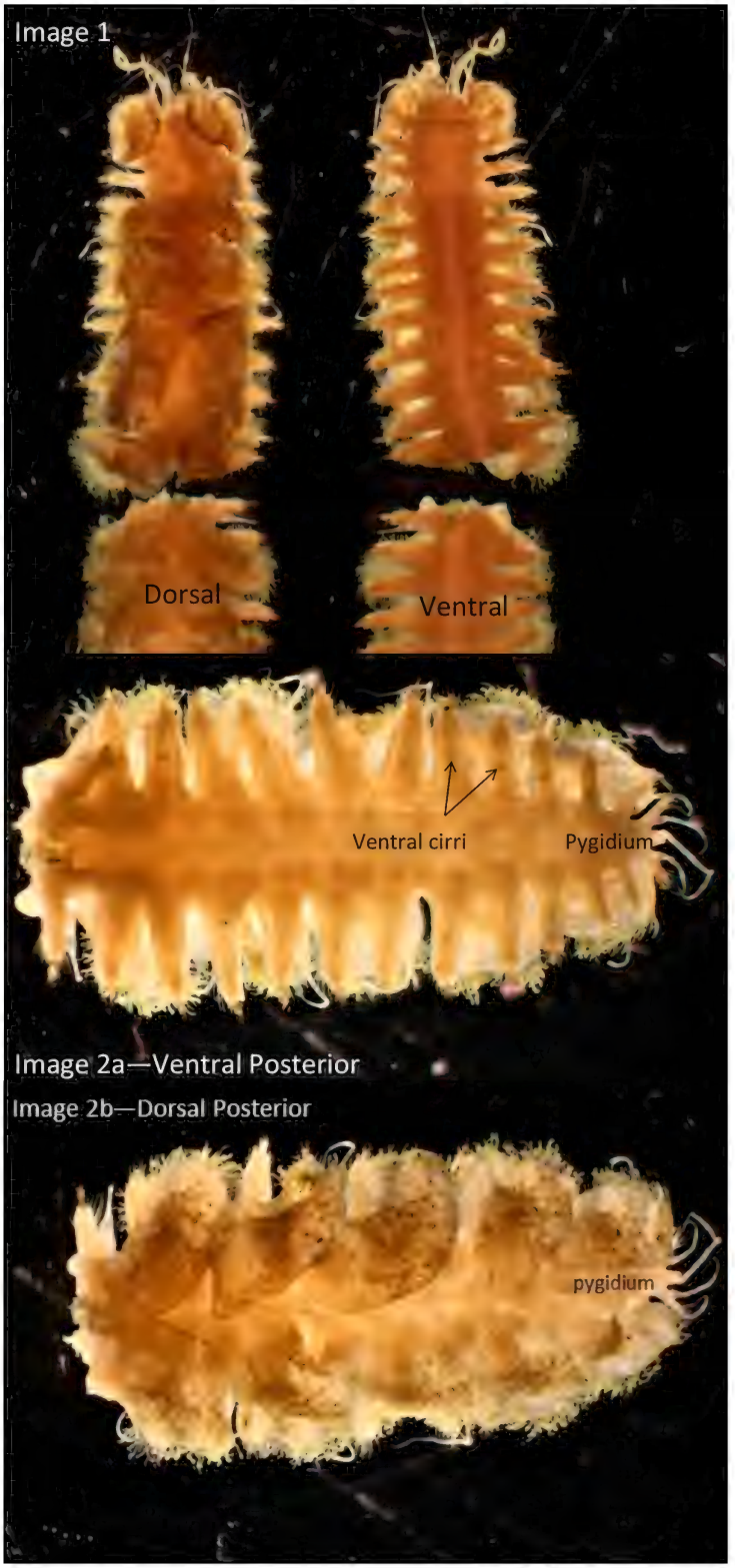
Species: *Lepidonotus* sp A SCAMIT, 2023 §
Synonyms: *Lepidonotus* sp LA1 Haggin, 2019 §

P-code—none assigned
ITI-code—none assigned

Subfamily: Lepidonotinae
Family: Polynoidae
Suborder: Aphroditiformia
Order: Phyllodocida
Subclass: Errantia
Class: Polychaeta
Phylum: Annelida

Diagnostic Characters:

1) ~18 mm X ~2 mm (4 mm with parapodia), complete but broken into 2 pieces **(Images 1, 2a & 2b)**.
2) Prostomium indistinctly bilobed, anterior portion projecting forward as ceratophores of lateral antennae; eyes present, 2 pair, posterior pair small and less pigmented **(Image 3)**.
3) Median antennae (MA) attached subterminally on distinct ceratophore in deep envagination created by lateral antennae. Median antennae slender with medial swelling and tapering to filiform tip **(Image 3)**.
4) Lateral antennae (LA) attached terminally, without distinct ceratophores. Slight medial swelling (not as pronounced as in MA) and tapering to filiform tips **(Images 3 & 4)**.
5) Palps longer than MA, tapering to filiform tips **(Images 3 & 4)**.
6) Tentaculophores long, with 1 spinous chaetae. Two pairs of tentacular cirri (similar in shape to MA & LA), longer than LA but shorter than MA **(Image 3)**.
7) Ventral cirri of chaetiger 1 very long, remainder are shorter and of equal length throughout (similar to those picture on chaetiger 11) **(Images 1, 2a, & 15)**.
8) 12 pair of elytra (~1.5 mm X 3 mm, overlapping slightly in mid-dorsum). Elytra with fringe of long papillae and macrotubercles of two types: 1) tall, bluntly conical; 2) short, broad, rounded. Both types of macrotubercles and fringe papillae present throughout **(Images 4-14)**.
9) Parapodia biramous. Notopodial lobe rounded, inserted anterodorsal to neuropodial lobe. Neuropodial lobe broadly rounded, with medial projection containing the acicula **(Image 15)**.



Images 8-12, 16-20 by B. Haggin
Images 1-7, 13-15 by N. Lee

Lepidonotus sp A

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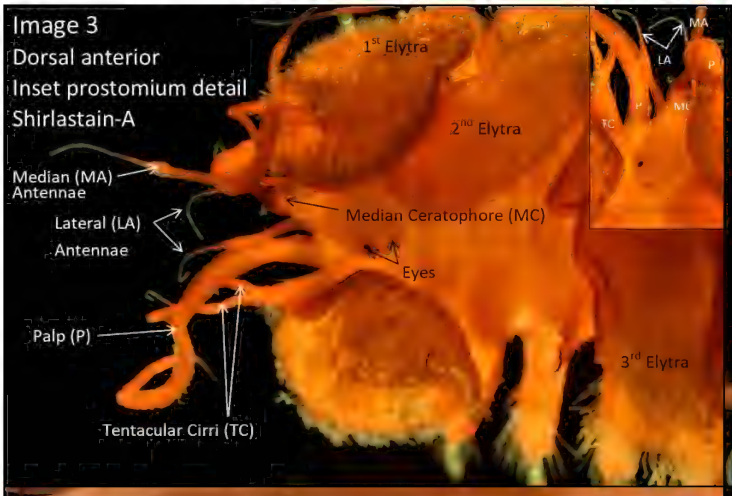

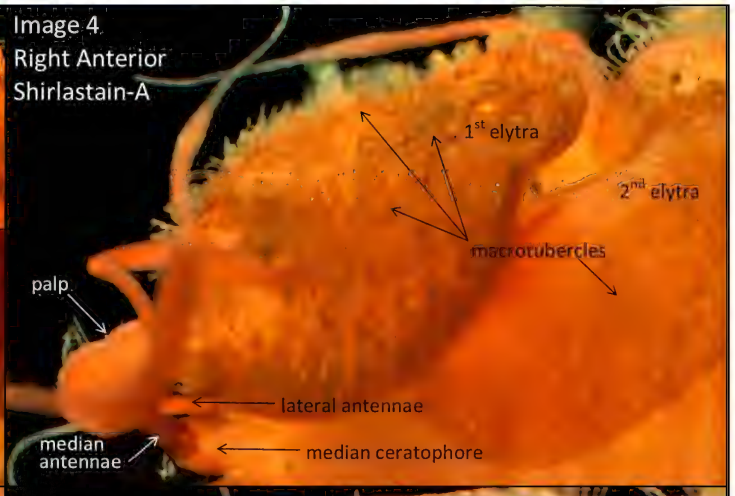

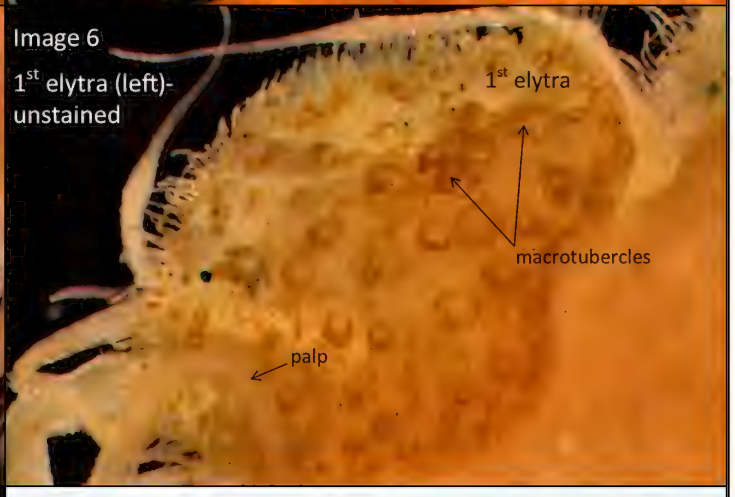

Diagnostic Characters (cont.):

10) Notochaetae of 2 types: 1) few short, with broad, pointed tips, with transverse rows of serrations on shaft; 2) numerous long, capillary-like, tapering to fine tips, with rows of paired bracts along shaft **(Images 16-18)**.

11) Neurochaetae stout, with unidentate, falcate tips and a cluster of small teeth subdistally **(Images 16, 19 & 20)**.

12) Pygidium with 1 long anal cirri **(Images 2a, 2b & 14)**.

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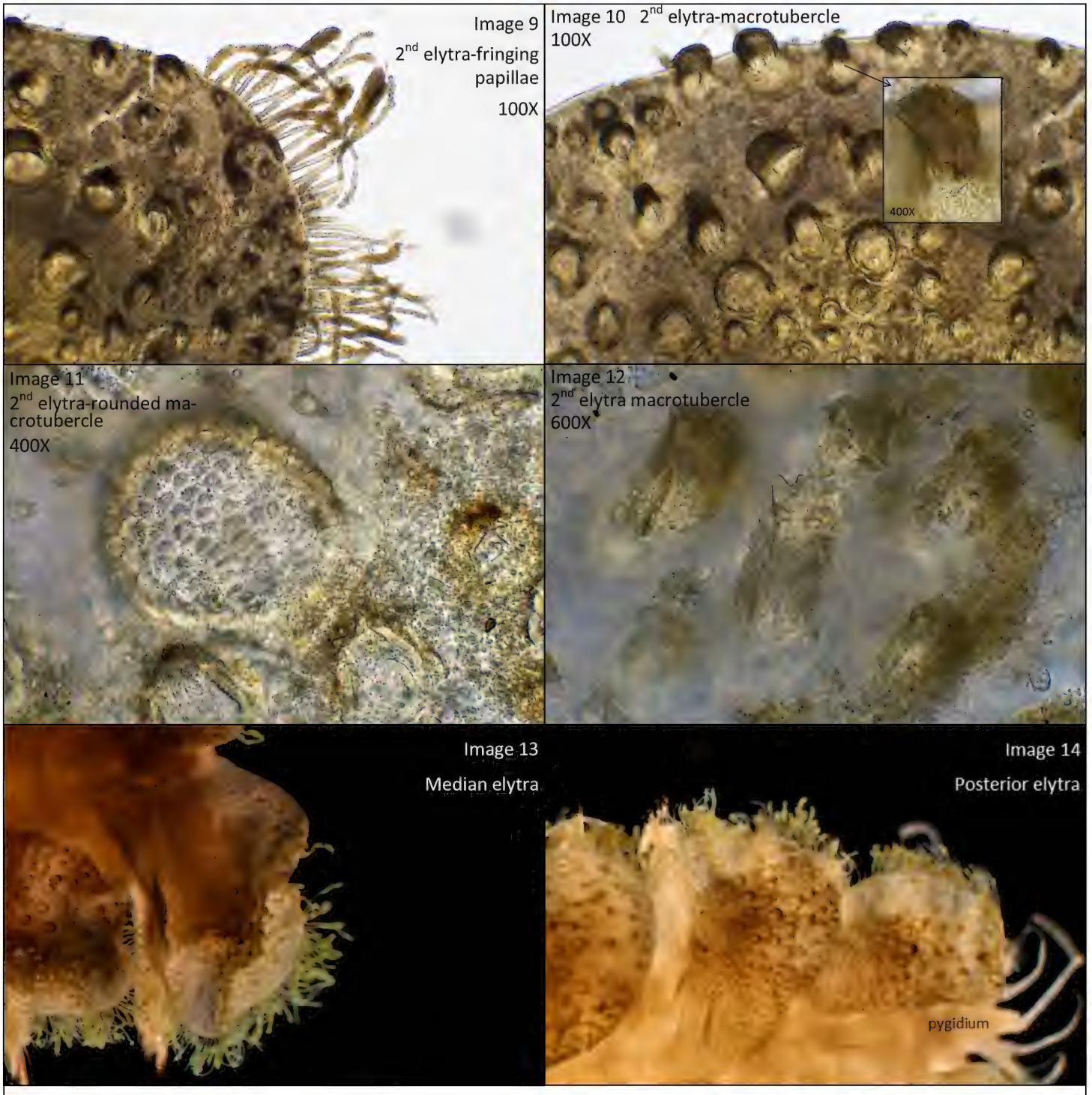

Pigmentation/MGS:

Preserved material unpigmented

Material Examined:

B'18-10362—San Pedro Channel, 745 m (33.63467N, 118.58360W—02AUG18) (1 ind.)

Lepidonotus sp A

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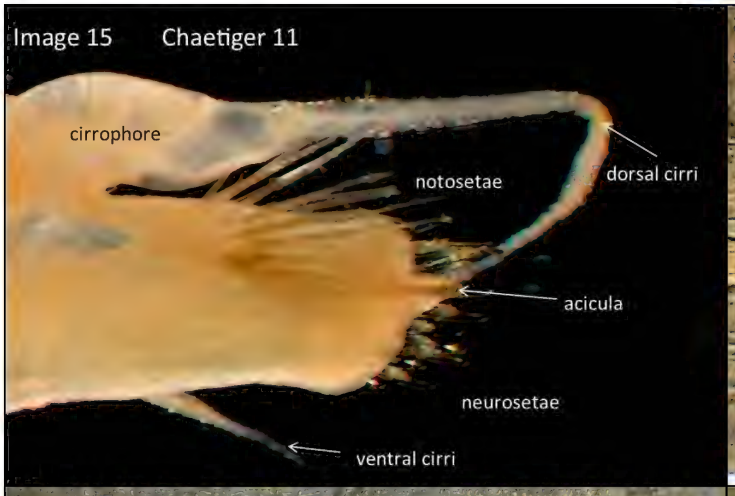

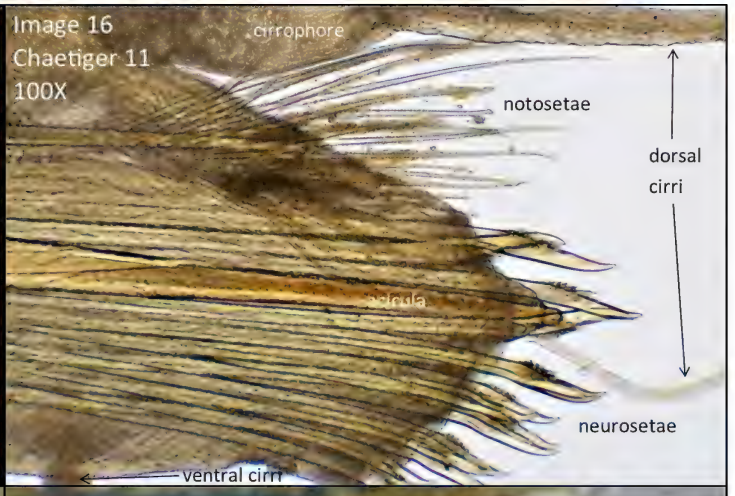

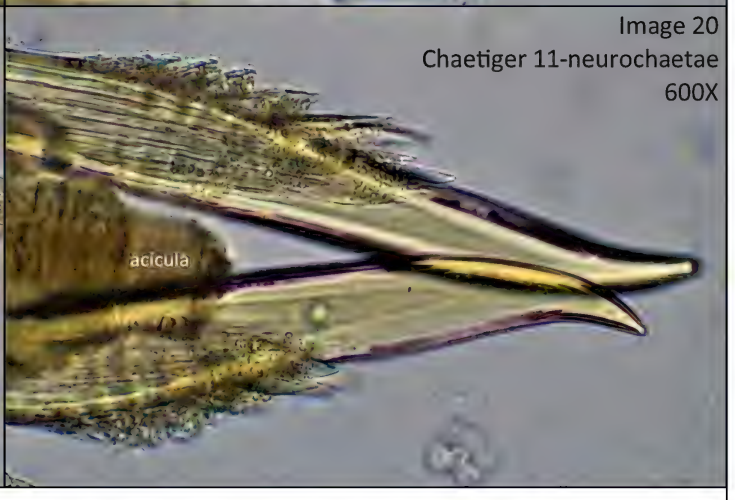

Similar Species:

Lepidonotus spiculus (Treadwell, 1906) (sensu Ruff, 1995)—*Lepidonotus spiculus* is similar to *Lepidonotus* sp A in having 12 pairs of elytra with macrotubercles and fringing papillae, the characteristics of the short notochaetae and the neurochaetae. The two differ in the details of the macrotubercles. *Lepidonotus spiculus* has three types of macrotubercles (bluntly conical, short rounded and sharply conical) rather than two in *L.* sp A (bluntly conical and short rounded). The macrotubercles of *L. spiculus* are also on polygonal basal plates. The basal plates of *L.* sp A are not evident and

Lepidonotus sp A

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Similar Species (cont.):

Lepidonotus spiculus (cont.): do not appear polygonal if present. The two also differ in the dentition of the capillary notochaetae, though there is a little confusion here. Ruff (1995) describes the capillary notochaetae of *Lepidonotus spiculus* as having a transverse row of serrations on the shaft of the notochaetae **(Image G below)** while Treadwell (1906) describe it as having a series of paired bracts along the shaft and Imajima (1997) illustrates it this way as well **(Image C below)**. *Lepidonotus* sp A has only paired bracts along the shaft. *Lepidonotus spiculus* was originally described from Monterey Bay, California and its range has since been expanded to occur from the west coast of North America to Japan from 84-126 m (Ruff, 1995 & Imajima, 1997). Leslie Harris (pers. comm.) has stated that *Lepidonotus spiculus* is typically found in shallow water on hard substrates.

Image G from Ruff, 1995

Image C from Imajima, 1997

Lepidonotus squamatus (Linnaeus, 1758)—The historical descriptions of *Lepidonotus squamatus* have been of poor quality, the best and most recent being that of Jirkov (2001) but the description either lacked good details or translated poorly from Russian. *Lepidonotus squamatus* is similar to *Lepidonotus* sp A in most characters, including both having 2 types of macrotubercles, bluntly conical and short, rounded and details of the neurochaetae. The illustration provided in Jirkov (2001) **(below)** appears to be of paired bracts along the shaft but the description provided was not conclusive. *Lepidonotus squamatus* is consistently described as having dark-brown or reddish elytra (Pettibone, 1963; Imajima & Hartman, 1964 & Jirkov, 2001), while *Lepidonotus* sp A has relatively unpigmented elytra. *Lepidonotus squamatus* was originally described from shallow water in western Europe and its range has since expanded to encompass southern and western Europe; California; Japan; Arctic (Imajima & Hartman, 1964) and off Korea (Jirkov, 2001). Pettibone (1963) lists *L. squamatus* as from low water to 1,400 fathoms (2560 m) but Jirkov (2001) list it as mainly from depths of less than 20 m. Based on the distribution and depth range *Lepidonotus squamatus* is likely a species complex and true *L. squamatus* likely does not occur locally.

Image from Jirkov, 2001

Habitat:

Lepidonotus sp A is known from a single individual from deeper water in the San Pedro Channel. It was found in sediments of clayey silt from 745 m. Also collected in the sample were the polychaetes *Myriochele gracilis* Hartman, 1955; *Maldane californiensis* Green, 1991; *Protis pacifica* Moore, 1923; *Cossura rostrata* Fauchald, 1972; *Aricidea* (*Acmira*) *rubra* Hartman, 1963; *Levinsenia oculata* (Hartman, 1957); *Phyllochaetopterus* sp A SCAMIT, 2023 § (reported as *Phyllochaetopterus* sp LA1 Haggin, 2019 §); *Syllis* sp A SCAMIT, 2023 § (reported as *Syllis* sp LA4 Haggin, 2019 §);

Lepidonotus sp A

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Habitat (cont.):

Kirkegaardia sp B SCAMIT, 2023 § (reported as *Kirkegaardia* sp LA1 Haggin, 2019 §); *Harmothoe* sp LA1 Furlong, 2014 §; and an unidentified syllid, an unidentified polynoid and an unidentified *Cossura*.

Discussion:

De Assis *et al*. (2015) gave the generic diagnosis of *Lepidonotus* as follows:

Body short, arched, with 26 segments. Bilobed prostomium extending anteriorly into ceratophores of terminally-attached lateral antennae. Antennae and cirri smooth. Facial tubercle present; buccal segment with or without nuchal fold. Twelve pairs of elytra on segments 2, 4, 5, 7.... 21 and 23. Notopodia small or vestigial; unidentate notochaetae short, slender, spinose, or notochaetae capillaries sometimes present. Neuropodia large, with or without acicular lobe; neurochaetae stout, long, with subdistal spines and unidentate or occasionally bidentate tips.

Currently there are 78 valid species of *Lepidonotus* listed on WoRMS with 3 of those reported from southern California and 1 described from California. Besides *Lepidonotus spiculus* and *L. squamatus*, *Lepidonotus caeruleus* Kinberg, 1856 is listed by De Assis *et al*. (2015) has having a distribution of Japan to California and Brazil. The species was described from Brazil and reports of this species from the NEP are doubtful. *Lepidonotus spiculus* is the only species of *Lepidonotus* currently listed in SCAMIT Ed. 13.

References:

De Assis, J. E., de Brito, R. J., Christoffersen, M. L. & de Souze, J. R. B. 2015. A catalogue of the scale-worm genus *Lepidonotus* (Polynoidae, Polychaeta) from South America, with two new records for Brazilian waters. *ZooKeys* 533: 63-98.

Imajima, M. 1997. Polychaetous Annelids from Sagami Bay and Sagami Sea Collected by the Emporer Showa of Japan and Deposited at the Showa Memorial Institute, National Science Museum, Tokyo. Families Polynoidae and Acoetidae. *National Science Museum Monographs* 13: 1-131.

Imajima, M. & Hartman, O. 1964. The Polychaetous Annelids of Japan. Part I. *Occasional Papers of the Allan Hancock Foundation* 26(1): 1-237.

Jirkov, I. A. 2001. [*Polychaeta of the Arctic Ocean*] (In Russian) *Polikhety severnogo Ledovitogo Okeana*. Yanus-K Press, Moscow, 632 pp.

Pettibone, M. H. 1963. Marine Polychaete Worms of the New England Region. 1. Families Aphroditidae Through Trochochaetidae. *Bulletin of the United States National Museum* 227(1): 1-356.

Read, G. & Fauchald, K. (Ed.) 2023. World Polychaeta Database. *Lepidonotus* Leach, 1816. Accessed through: World Register of Marine Species at: https://www.marinespecies.org/aphia.php?p=taxdetails&id=129496 on 2023-04-12

Ruff, R. E. 1995. Family Polynoidae Malmgren, 1867. 105-166. IN: Blake, James A., Hilbig, Brigitte, and Scott, Paul H. (Ed.). *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. Volume 5 - The Annelida Part 2. Polychaeta: Phyllodocida (Syllidae and scale-bearing families), Amphinomida, and Eunicida*. Santa Barbara Museum of Natural History. Santa Barbara.

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References (cont.):

SCAMIT. 2021. *A Taxonomic Listing of Benthic Marco- and Megainvertebrates from Infaunal & Epifaunal Monitoring and Research Programs in the Southern California Bight, Edition 13*. Cadien, D. B., Lovell, L. L., Barwick, K. L., Haggin, B. M., eds. 203pp.

Treadwell, A. L. 1906. Polychaetous annelids of the Hawaiian Islands collected by the steamer Albatross in 1902. *Bulletin of the United States Fish Commission* 23(3): 1145-1181.

Other Literature Consulted:

Hartman, O. 1938. The Types of the Polychaete Worms of the Families Polynoidae and Polyodontidae in the United States National Museum and the Description of a New Genus. *Proceedings of the United States National Museum* 86(3046): 107-134.

Linnaeus, C. 1758. Systema Naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. *Editio decima, reformata [10th revised edition],* vol. 1: 824 pp.

Version History:

Version 1.0—Draft voucher sheet created (09MAR2020)

Version 2.0—Voucher sheet completed, images updated and updated format to conform with new SCAMIT guidelines (06OCT2022)

Version 3.0—Updated name to *Lepidonotus* sp A and author to SCAMIT, 2023 §; Updated Similar Species section; Updated Discussion section; Updated names of co-occurring species; Updated References (12APR2023)

Voucher Sheet

B. Haggin

April, 2023

Species: *Onuphis* sp B SCAMIT, 2023 §

P-Code—none assigned

Synonyms: *Onuphis* sp LA1 Haggin, 2019 §

ITI—Group 1

Subfamily: Onuphinae
Family: Onuphidae
Order: Eunicida
Subclass: Errantia
Class: Polychaeta
Phylum: Annelida

Diagnostic Characters:

147 chaetigers (incomplete) 61 mm X 2 mm (including parapodia)

1) Prostomium sub-triangular, with clavate frontal antennae (FA), tapering distally.
2) Eyes present, 1 pair, far lateral on prostomium, obscured by the Inner Lateral Antennae from above. Eyes a collection of many small spots.
3) Peristomium about = in size to chaetiger 1, slightly smaller than prostomium **(Images 1 & 2)**. Peristomial cirri long, extending beyond anterior margin of prostomium, to about midpoint of Frontal Antennae.
4) Outer Lateral Antennae (OLA) with ~25 annulations, reaching to chaetiger 2 **(Images 1—3)**. **Ceratophores with brown pigment on annulations 2-5 and 14-16. Subdermal pigment spot in annulations 3 & 4, 10 & 11 and 17 & 18. Styles short, ~½ length of ceratophore, with brown pigment at base of styles.**
5) Inner Lateral Antennae (ILA) with 29 to 30 annulations, reaching to around chaetiger 10 **(Images 1—3)**. **Ceratophores with brown pigment on annulations 3-6 and 18-24. Subdermal pigment spot in annulations 3-7, 12-14 and 18 & 19. Styles long, ~1.3X ceratophores, with brown pigment at base of styles.**
6) Median Antennae (MA) with ~20 annulations, reaching to chaetiger 6 or 7 **(Images 1—3)**. **Ceratophores with brown pigment on annulations 2-5 and 10-13. Subdermal pigment spot in annulations 4 & 5 and 10 & 11. Styles slightly longer than ceratophores, with light brown pigment at base of style (not as noticeable as in ILA & OLA).**
7) Branchiae from chaetiger 1 **(Images 1, 2 & 4)**. Pectinate with 5 (maybe a small 6) filaments at maximum development **(Image 7)**. 1st branching from chaetiger 17; 2nd branch from chaetiger 26.
8) Dorsal cirri digitate, slender, ≤ length of branchiae in most chaetigers (longer in 1st 2 or 3 chaetigers only) **(Images 4—7)**.
9) Ventral cirri digitate in chaetigers 1-6 **(Image 3)**, papilliform in chaetiger 7, globose in chaetiger 8 and pad-like from chaetiger 9 (globose VC in chaetiger 8 may be small pad).
10) Postchaetal lobe (PL) digitate for 23 chaetigers (reducing rapidly in size from chaetiger 13) then small, conical to chaetiger 35 **(Images 4—6)**. PL reduced to papillae after.
11) Interramal papillae present on chaetigers 5-10 **(Images 5 & 6)**.

Onuphis sp B

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Voucher Sheet

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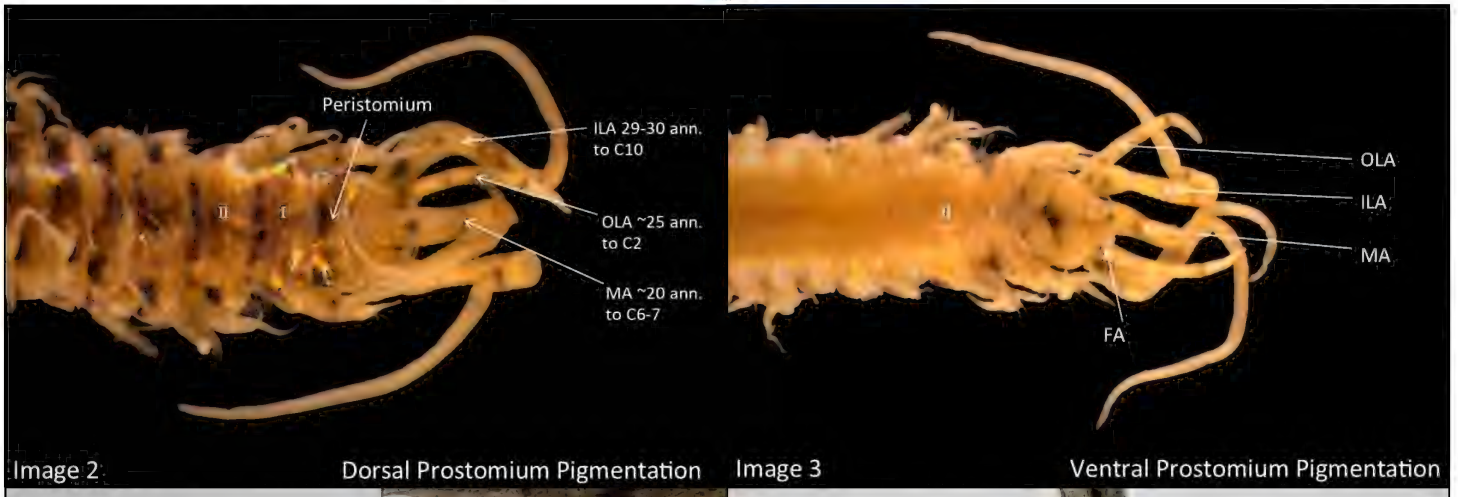
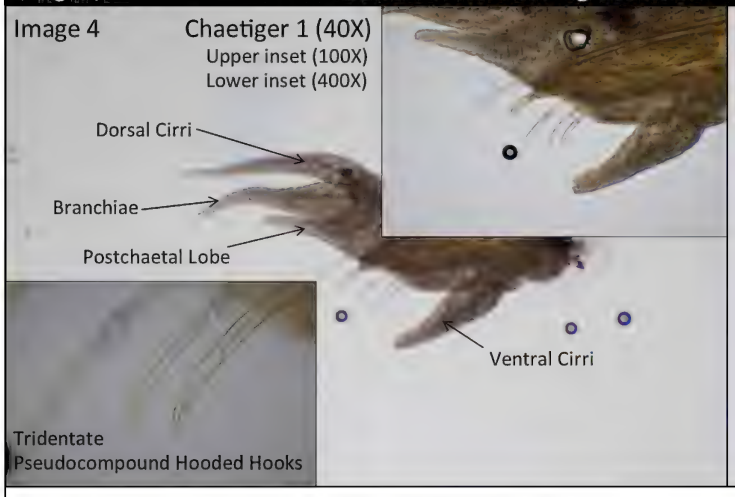
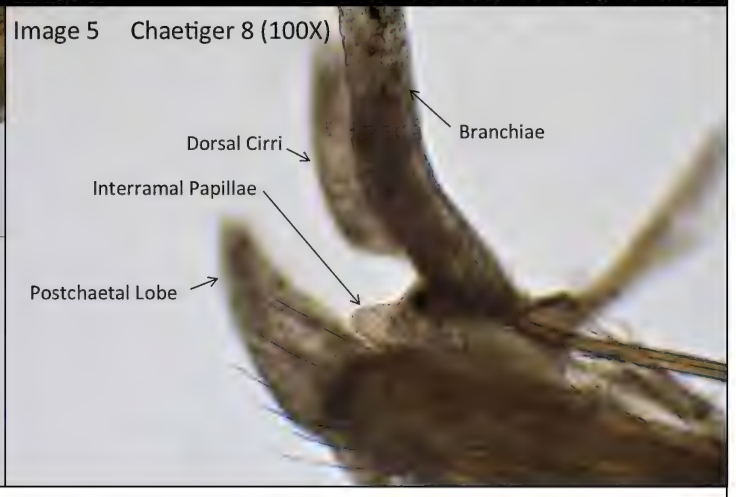


Image 2 Dorsal Prostomium Pigmentation

Image 3 Ventral Prostomium Pigmentation





Diagnostic Characters (cont.):

12) Pseudocompound Hooded Hooks (PCHH) present on chaetigers 1-5. Tridentate, with proximal tooth very thin and set close to median tooth (may appear bidentate) **(Image 4)**.

13) Subacicular Hooded Hooks present from chaetiger 10; bidentate, hooded **(Image 6)**.

14) Pectinate chaetae present from chaetiger 6, distally slightly oblique, with 9-10 very long teeth.

15) Limbate chaetae with very fine wings present on all chaetigers **(Image 5)**.

16) Compound spinigers absent.

17) Maxillary Formula: MI 1+1 (falcate); MII 9+9; MIII 8+0; MIV 6+8(9); MV 1+1 (oval plates, rounded at one end and pointed at the other, giving appearance of a tooth) **(Images 8 - 11)**.

18) Pygidium unknown.

19) Cuticle iridescent.

Pigmentation:

1) Prostomium with transverse brown band anterior to MA, stretching between the bases of OLA & ILA **(Images 1 & 2)**.

2) Peristomium with transverse brown band dorsally and scattered pigment around the edge of lips ventrally **(Images 1—3)**.

3) Anterior chaetigers with transverse brown bands dorsally and 2 brown pigment patches (1 dorso-lateral & 1 ventro-lateral) on posterior of parapodia base (dorso-lateral patch connects to dorsal bands, ventro-lateral patch separate) **(Images 1—3)**.

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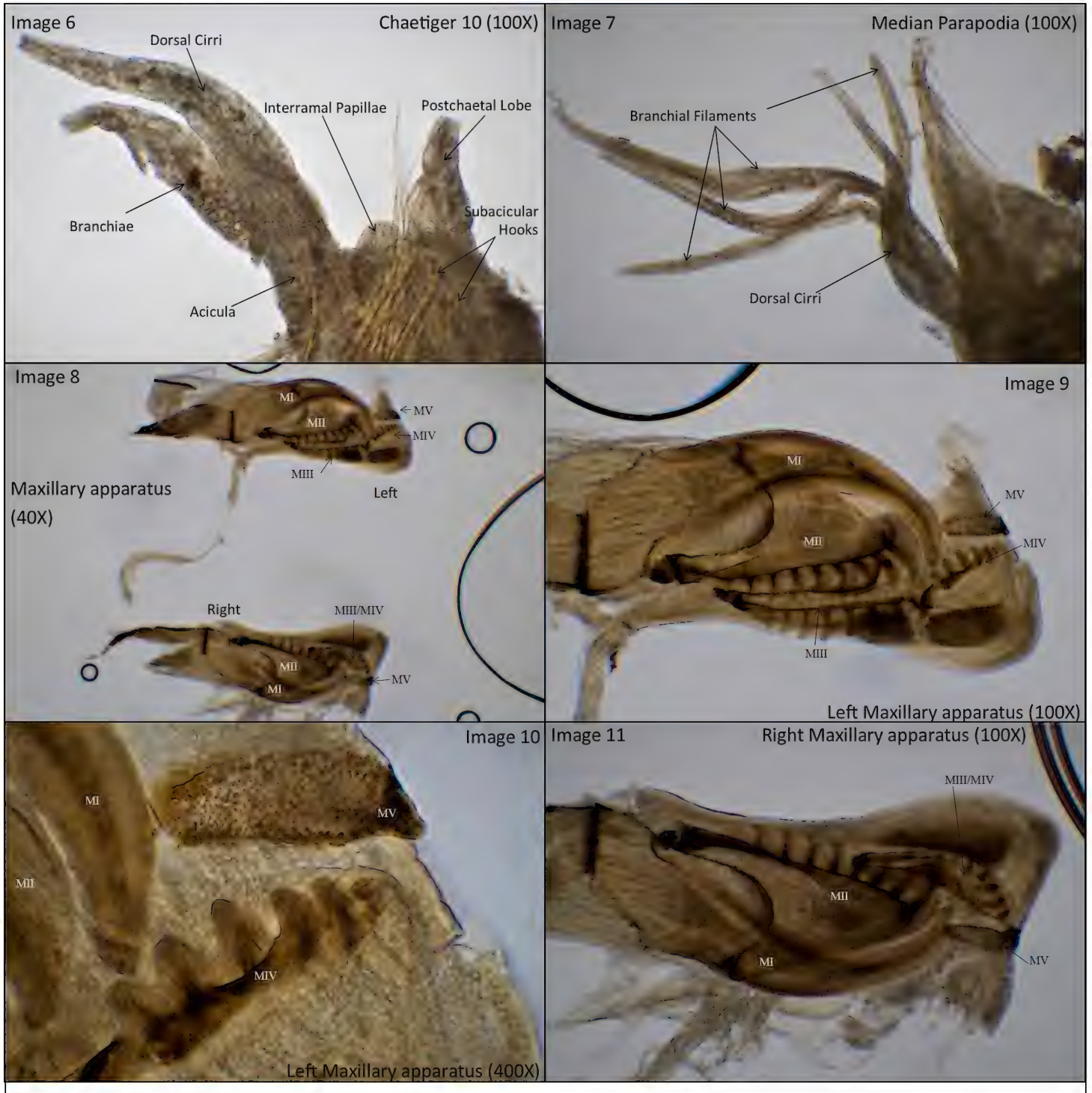

Pigmentation (cont.):

4) Slight brown pigment in posterior interramal region of parapodia.
5) Dorsal pigment decreasing in intensity thru chaetiger 40 **(Image 1)**.
6) ** See also description of ceratophore pigmentation on page 1 **

Images 1-7 by N. Lee
Images 8-11 by B. Haggin

Onuphis sp B

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Material Examined:

0888-1D—off Rocky Point, Palos Verdes, 31m (1 ind., incomplete—147 chaetigers) (33.76500N, 118.43530W—05AUG88) **(all images)**

Similar Species:

Onuphis eremita parva Berkeley & Berkeley, 1941 — *Onuphis eremita parva* & *Onuphis* sp B are similar by the presence of interramal papillae in anterior chaetigers and branchiae present from chaetiger 1 and becoming pectinate. However, the branchiae in *O. e. parva* first branch in chaetigers 23 - 30 and in *O.* sp B they first branch in chaetiger 17 and a second branch in chaetiger 26. The two species differ in the number of chaetigers with pseudocompound hooded hooks (1-4 in *O. e. parva* & 1-5 in *O.* sp B), the start of subacicular hooded hooks (chaetiger 8 in *O. e. parva* & chaetiger 10 in *O.* sp B), the maximum number of annulations on the occipital ceratorphores (21 annulations in *O. e. parva* & 30 annulations in *O.* sp LA1) and the start of pad-like ventral cirri (chaetiger 7 in *O. e. parva* & chaetiger 8 or 9 in *O.* sp B).

Onuphis multiannulata Shisko, 1981 — *Onuphis multiannulata* and *Onuphis* sp B are similar in the first appearance of subacicular hooded hooks at chaetiger 10 and the branchiae present from chaetiger 1 and becoming pectinate, but differ in the maximum number of branchial filaments (3 filaments in *O. multiannulata* & 5(maybe 6) filaments in *O.* sp B) and both have pseudocompound hooded hooks in the first 5 chaetigers but differ in their dentition (bi- & tridentate in *O. multiannulata* & tridentate in *O.* sp B). The two species differ in their maxillary formula (*O. multiannulata*—MII 8/9+10; MIII 10+0; MIV 7+10/11 and *O.* sp B—MII 9+9; MIII 8+0; MIV 6+8(or 9, difficult to count)), *O. multiannulata* lacks the interramal papillae in anterior chaetigers that are present in *O.* sp B and *Onuphis multiannulata* lacks pigment while *Onuphis* sp B is heavily pigmented in anterior chaetigers.

Habitat:

Onuphis sp B is known from a single specimen from off Rocky Point, Palos Verdes, CA in shallow water (31m) in sediments of silty sand. Also collected in the sample were the polychaetes *Platynereis bicanaliculata* (Baird, 1863); *Nereis* sp A SCAMIT, 2007 §; *Glycinde armigera* Moore, 1911; *Glycera nana* Johnson, 1901; *Glycera oxycephala* Ehlers, 1887; *Diopatra tridentata* Hartman, 1944; *Onuphis* sp A SCAMIT, 1992 §; *Mooreonuphis nebulosa* (Moore, 1911); *Podarkeopsis glabrus* (Hartman, 1961); *Micropodarke dubia* (Hessle, 1925); *Lumbrineris latreilli* Audouin & H. Milne Edwards, 1834; *Phyllodoce hartmanae* Blake & Walton, 1977; *Nephtys californiensis* Hartman, 1938; *Nephtys caecoides* Hartman, 1938; *Tenonia priops* (Hartman, 1961); *Sthenelanella uniformis* Moore, 1910; *Sthenelais tertiaglabra* Moore, 1910; *Dipolydora caulleryi* (Mesnil, 1897); *Dipolydora socialis* (Schmarda, 1861); *Laonice cirrata* (M. Sars, 1851); *Paraprionospio alata* (Moore, 1923); *Prionospio lighti* Maciolek, 1985; *Prionospio jubata* Blake, 1996; *Spiophanes duplex* (Chamberlin, 1919); *Spiophanes norrisi* Meißner & Blank, 2009; *Ampharete labrops* Hartman, 1961; *Melinna oculata* Hartman, 1969; *Lanice conchilega* (Pallas, 1776); *Streblosoma crassibranchia* Treadwell, 1914; *Pista wui* Saphronova, 1988; *Spiochaetopterus costarum* Cmplx; *Chaetozone corona* Berkeley & Berkeley, 1941; *Chaetozone setosa* Cmplx; *Aphelochaeta-Monticellina* Cmplx; *Scalibregma californicum* Blake, 2000; *Aricidea* (*Aricidea*) *wassi* Pettibone, 1965; *Leitoscoloplos pugettensis* (Pettibone, 1957); Euclymeninae sp A SCAMIT, 1987 §; *Dialychone veleronis* (Banse, 1972); an unidentified *Chone*, an unidentified *Lumbrineris*, an unidentified *Mediomastus*, and an unidentified *Nereiphylla.*

Discussion:

Arias (2016) gave the generic diagnosis of *Onuphis* as follows:

Prostomium often anteriorly extended; with frontal lips. Antennae and palps with ceratophores usually with 10-25 rings and short to moderately long styles, palpostyles shorter than palpophores. Nuchal grooves straight. Peristomial cirri present. Anterior three to four (rarely two to five) pairs of parapodia modified but not enlarged. Ventral cirri subulate on anterior four to six chaetigers; dorsal cirri moderately long. Branchiae rarely absent, usually present from chaetiger 1, rarely 3-6; single or pectinate filaments (maximum 12). Hooks of modified parapodia usually tridentate (rarely only bidentate, sometimes bi– to multidentate) Pseudocompound with relatively short hoods; median hook slightly larger but not becoming simple and changing to large median hook. Hooks varying specifically, from all having appendages of almost equal thickness and length to being clearly differentiated into slender long-appendaged and robust short-appendaged hooks. Dorsal limbate chaetae from chaetiger 1, ventral limbate chaetae replacing Pseudocompound hooks from chaetiger 4 or later until replaced by bidentate hooded Subacicular hooks usually from chaetiger 9-14. Tubes round in section, ranging from thin mucous to tough parchment-like inner layer covered with extraneous particles.

Onuphis sp B

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B. Haggin

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Discussion (cont.):

Onuphis sp B may be *Onuphis eremita parva* but the description of *O. e. parva* was vague and the variability of characters within the species is unknown. Recent work (Arias & Paxton 2014) suggest that *Onuphis eremita* is a species complex and due to differences in the insertions of some characters a provisional species, *Onuphis* sp B, has been erected. WoRMS currently lists 47 accepted species of *Onuphis* and SCAMIT Ed. 13 has 7 named species and 3 provisional species of *Onuphis*. *Onuphis* sp B would be the 4th provisional species when added in Edition 14.

References:

Arias, A. 2016. *Onuphis* and *Mooreonuphis* (Annelida: Onuphidae) from West Africa with the description of three new species and the reinstatement of O. landanaensis Augener, 1918. *Zootaxa* 4168(3): 481-511.

Arias, A. & Paxton, H. 2014. Hidden diversity within the polychaete *Onuphis eremita sensu lato* (Annelida: Onuphidae)—redescription of *O. eremita* Audouin & Milne-Edwards, 1833 and reinstatement of *Onuphis pancerii* Claparède, 1868. *Zootaxa* 3861(2): 145-169.

Berkeley, E. & Berkeley, C. 1941. On a collection of Polychaeta from Southern California. *Bulletin of the Southern California Academy of Sciences* 40(1): 16-60.

Read, G. & Fauchald, K. (Ed.) 2023. World Polychaeta Database. *Onuphis* Audouin & Milne Edwards, 1833. Accessed through: World Register of Marine Species at: https://www.marinespecies.org/aphia.php?p=taxdetails&id=129404 on 2023-04-12

SCAMIT. 2021. *A Taxonomic Listing of Benthic Marco- and Megainvertebrates from Infaunal & Epifaunal Monitoring and Research Programs in the Southern California Bight, Edition 13*. Cadien, D. B., Lovell, L. L., Barwick, K. L., Haggin, B. M., eds. 203pp.

Shisko, J. F. 1981. Five new polychaetes of the families Euncidae and Onuphidae, collected in 1975 and 1976 during the Southern California Baseline Project. *Proceedings of the Biological Society of Washington* 94(4): 968-983.

Other Literature Consulted:

Fauchald, K. 1982. Revision of *Onuphis*, *Nothria*, and *Paradiopatra* (Polychaeta: Onuphidae) based upon type material. *Smithsonian Contributions to Zoology* 356: 1-109.

Gil, J. & Machado, M. 2014. A new species of *Onuphis* (Polychaeta: Onuphidae) from Southern Portugal, with comments on the validity of *O. pancerii* Claparède, 1868. *Zootaxa* 3860(4): 343-360.

Hartman, O. 1968. *Atlas of the Errantiate Polychaetous Annelids from California*. Los Angeles, Ca, University of California, Allan Hancock Foundation.

Hilbig, B. 1995. Family Onuphidae Kinberg, 1865. pages 229-262. IN: Blake, James A., Hilbig, Brigitte, and Scott, Paul H. (Ed.). *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. Volume 5—The Annelida Part 2. Polychaeta: Phyllodocida (Syllidae and scale-bearing families), Amphinomida, and Eunicida*. Santa Barbara Museum of Natural History. Santa Barbara.

León-González, J. A. de 1994. Soft bottom polychaetes from the western coast of Baja California Sur, Mexico. 4. Onuphidae. *Cahiers Biologie Marine* 35: 57-67.

Version History:

Version 1.0—Voucher sheet created (01AUG2019)

Version 2.0—Updated voucher sheet to new SCAMIT guidelines; Updated photo labelling to reduce image clutter; Updated name to *Onuphis* sp B and author to SCAMIT, 2023 §; Updated material examined section; Updated References section; Added ITI-Code; Added Habitat, Discussion and Other Literature Consulted sections (12APR2023)

Voucher Sheet

B. Haggin
April, 2023

Species: *Phyllochaetopterus* sp A SCAMIT, 2023 §
P-code—see Discussion
Synonyms: *Phyllochaetopterus* sp LA1 Haggin, 2019 §
ITI-code—none assigned

Family: Chaetopteridae
Suborder: Terebellimorpha
Order: Terebellida
Infraclass: Canalipalpata
Subclass: Sedentaria
Class: Polychaeta
Phylum: Annelida

Diagnostic Characters:

1) Largest fragment 17.4 mm for 17 chaetigers; 3.3 mm long and 1.6 mm wide across Region A.
2) Prostomium rounded, eyes absent; tentacular cirri present on chaetiger 1 **(Image 1)**.
3) Region A with 9 chaetigers **(Image 2)**.
4) Region B with 2 chaetigers, notopodia appear bilobed **(Images 3, 4)**.
5) Region C incomplete, # of segments unknown; parapodia bottle-shaped **(Image 5)**.
6) Chaetiger 4 with 1 cutting chaetae, 3-sided and asymmetrical apically, with etchings in concavities and on shaft **(Images 6, 7)**; notochaetae long, lanceolate, slightly asymmetrical **(Images 6, 8)**; neurochaetae short, lanceolate, highly asymmetrical **(Images 6, 9)**.
7) Tube thin, clear, parchment-like.

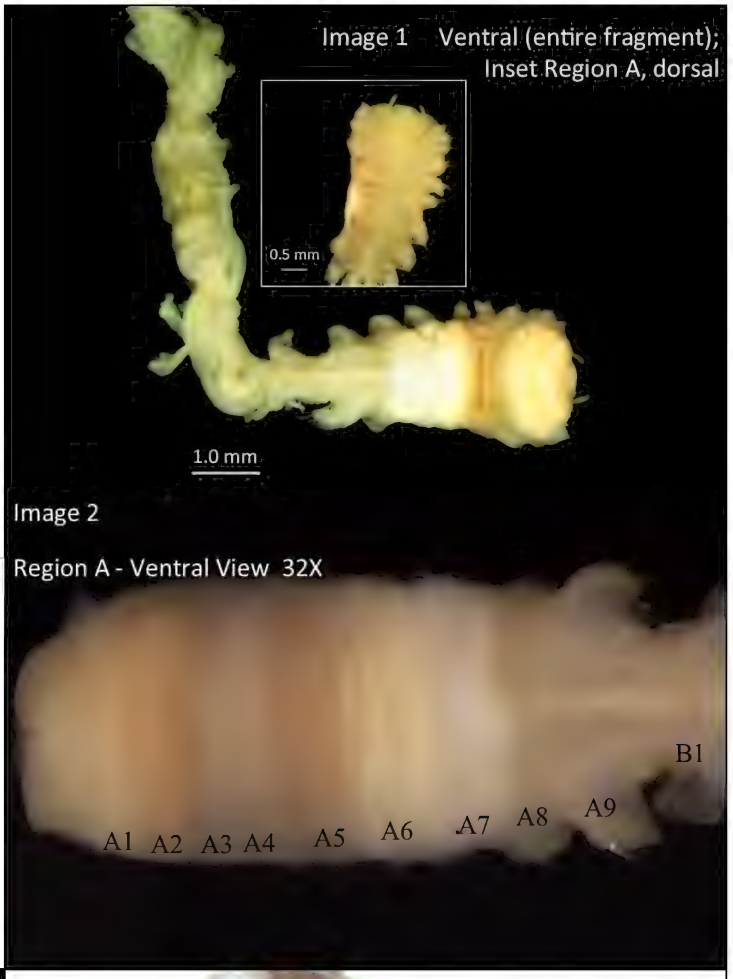
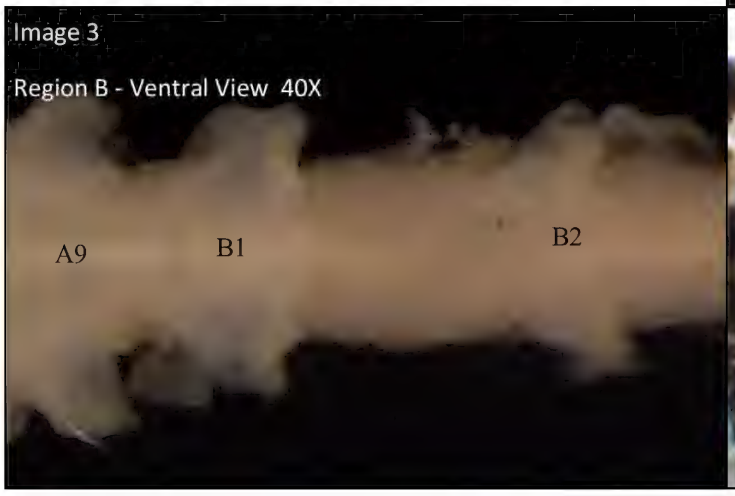
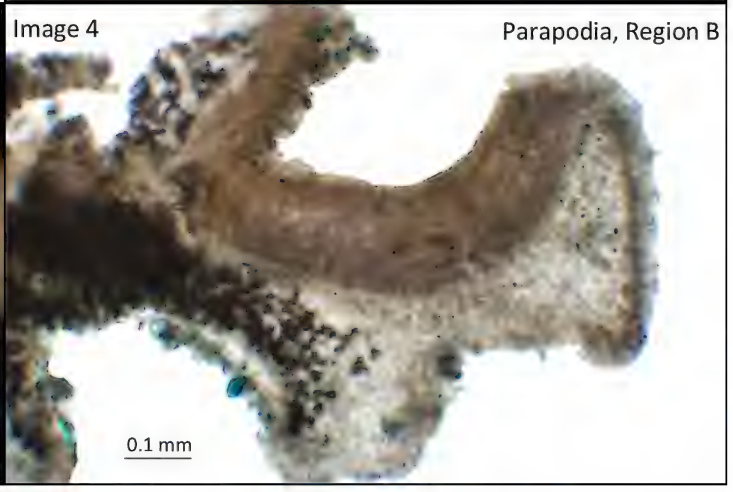


Image 1 Ventral (entire fragment); Inset Region A, dorsal
0.5 mm
1.0 mm
Image 2
Region A - Ventral View 32X
A1 A2 A3 A4 A5 A6 A7 A8 A9
B1





All photos by B. Haggin

Pigmentation/MGS:

Prostomium, peristomium and A1 unpigmented; A2 yellow-brown; A3-A4 speckeled brown; A5 brown; A6 glandular, white; A7 non-glandular, white; A8-A9 brown, fading to unpigmented **(Image 2)**.

Phyllochaetopterus sp A

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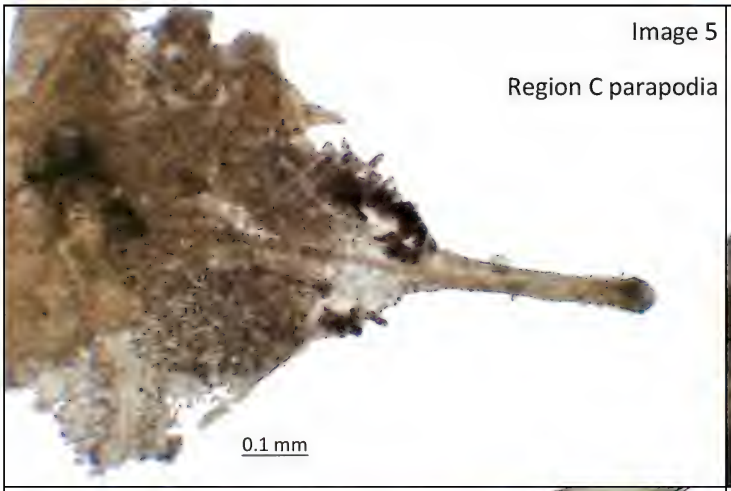

Image 5

Region C parapodia

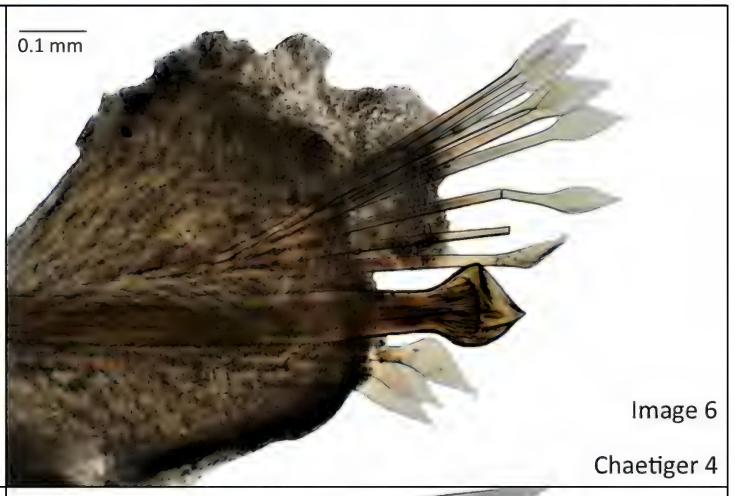

Image 6

Chaetiger 4

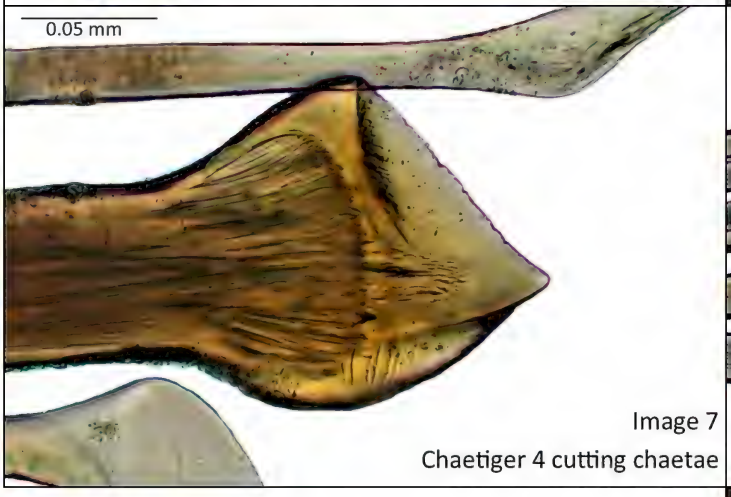

Image 7

Chaetiger 4 cutting chaetae

Image 8

Chaetiger 4 notochaetae

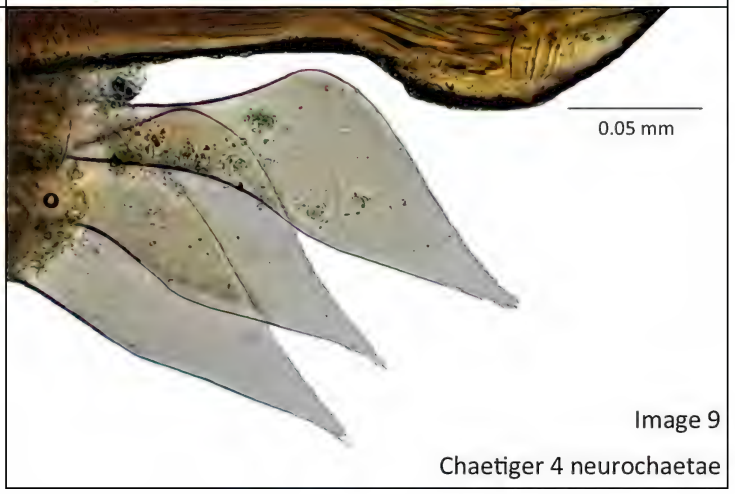

Image 9

Chaetiger 4 neurochaetae

Material Examined:

B'18-10355—South of Pt. Dume, Santa Monica Basin/San Pedro Channel, 818 m (5 inds.) (33.88369N, 118.79006W—17AUG18) **(Images 2-9)**

B'18-10366—Off Two Harbors, Santa Catalina Island, San Pedro Channel, 883 m (2 inds.) (33.48691N, 118.42353W—02AUG18) **(Image 1)**

Also from B'18-10362—San Pedro Channel, 745 m (33.63467N, 118.58360W—02AUG18)

Similar Species:

Phyllochaetopterus limicolus Hartman, 1960—*Phyllochaetopterus limicolus* is similar to *Phyllochaetopterus* sp A in having 9 chaetigers in Region A, 2 chaetigers in Region B, a single cutting chaetae in chaetiger 4 and lacking eyes. The two differ in the ventral pigment pattern of Region A. *Phyllochaetopterus limicolus* has been described with some variability in this pigmentation. Hartman (1960) described it as chalky white thru chaetiger 2, dark tawny or brown from 3-5, chalky white from 6-8 then grayish green. Blake (1996) describes it as pale on chaetiger 1, covered in small pigment spots becoming a reddish-brown band between 5/6 or 6/7, then a large glandular shield on 6-8. SCAMIT (1992)

Phyllochaetopterus sp A

SCAMIT, 2023 §

Voucher Sheet
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April, 2023

Similar Species (cont.):

Phyllochaetopterus limicolus (cont.): discussed the variation in pigment and described *P. limicolus* as having brown coloration on chaetigers 5 & 6, and chalky white on chaetigers 6-8. All of these description differ from the alternating narrow pigment bands found in *Phyllochaetopterus* sp A.

Phyllochaetopterus prolifica Potts, 1914 (sensu Blake, 1996)—*Phyllochaetopterus prolifica* is similar to *P.* sp A in having a single cutting chaetae in chaetiger 4 but differs in a number of ways. *Phyllochaetopterus prolifica* has eyes that are lacking in *P.* sp A and can have up to 12 chaetigers in both Regions A & B. The ventral pigment pattern of Region A is also different between the two species.

Phyllochaetopterus sp LH1 Harris, 2017 §—*Phyllochaetopterus* sp LH1 is similar to *P.* sp A in having a single cutting chaetae in A4 but differs in having up to 10 chaetigers in Region A and over 30 in Region B. The ventral pigment of Region A is a solid brown in *P.* sp LH1, rather than alternating as in *Phyllochaetopterus* sp A.

Phyllochaetopterus gigas Nishi & Rouse, 2014—*Phyllochaetopterus gigas* is similar to *Phyllochaetopterus* sp A in having 9 chaetigers in Region A, 2 chaetigers in Region B, and lacking eyespots. *Phyllochaetopterus gigas* differs in the number of cutting chaetae in chaetiger 4, with up to 6, compared to 1 in *Phyllochaetopterus* sp A. The ventral pigment pattern of Region A also differs, consisting of a broad light patch followed by a broad dark patch and a large white, glandular region on chaetigers 7 and 8 in *Phyllochaetopterus gigas*, where it is a series of alternating thin bands and a narrow white, glandular region on chaetiger 6 in *P.* sp A. *Phyllochaetopterus gigas* has short, inconspicuous tentacular cirri, while *P.* sp A has relatively large tentacular cirri. *Phyllochaetopterus gigas* is known only from the vicinity of whale falls in Monterey Canyon in 2892 m.

Habitat:

Phyllochaetopterus sp A is known from deeper water in the San Pedro Channel. It is found in sediments of clayey silt from 745-883 m. Also collected in the samples were the polychaetes *Amage longibranchiata* Hartman, 1960 (10355, 10366); *Ampharete cornuta* (Hilbig, 2000) (10355); *Myriochele gracilis* Hartman, 1955 (10362); *Maldane californiensis* Green, 1991 (10362); *Syllis* sp A SCAMIT, 2023 § (reported as *Syllis* sp LA4 Haggin, 2019 §) (10362); *Protis pacifica* Moore, 1923 (10355, 10362, 10366); *Aricidea* (*Acmira*) *rubra* Hartman, 1963 (10362); *Aricidea* (*Acmira*) sp LA1 Lovell, 2014 § (10355, 10366) *Levinsenia oculata* (Hartman, 1957) (10362); *Cossura rostrata* Fauchald, 1972 (10362); *Kirkegaardia* sp B SCAMIT, 2023 § (reported as *Kirkegaardia* sp LA1 Haggin, 2019 §) (10355, 10362, 10366); *Chaetozone* sp D SCAMIT, 2023 § (reported as *Chaetozone* sp LA2 Haggin, 2019 §) (10355); *Harmothoe* sp LA1 Furlong, 2014 § (10362); *Lepidonotus* sp A SCAMIT, 2023 § (reported as *Lepidonotus* sp LA1 Haggin, 2019 §) (10362); and an unidentified polynoid (10362), an unidentified *Aricidea* (10355), an unidentified *Cossura* (10362).

Discussion:

Nishi & Rouse (2007) separated the genus *Phyllochaetopterus* into 4 groups based on the combination of number of cutting chaetae in A4 and the number of chaetigers in Region B. The groupings are as follows:

Group A—1-2 cutting chaetae in A4 & 2 chaetigers in Region B

Group B—1-2 cutting chaetae in A4 & 3 or more chaetigers in Region B

Group C—more than 6 cutting chaetae in A4 & 2 chaetigers in Region B

Group D—more than 6 cutting chaetae in A4 & 3 or more chaetigers in Region B

Phyllochaetopterus sp A would be placed into Group A with *Phyllochaetopterus limicolus*.

Phyllochaetopterus sp A

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Discussion (cont.):

The P-Value Tool file has a P-Code of "P389" for *Phyllochaetopterus limicolus*. *Phyllochaetopterus limicolus* is the most likely species for *Phyllochaetopterus* sp A to have been identified as in the past, but I am not sure if it should inherit P-Code "P389" from *Phyllochaetopterus limicolus*. Leslie Harris (SCAMIT, 2022) has expressed that true *Phyllochaetopterus limicolus* is found in deep water, it has a broad thorax and a thinner, tapering abdomen. It is possible that *P*. sp A is *P. limicolus* and the difference in ventral pigment is just variation.

WoRMS currently lists 22 valid species of *Phyllochaetopterus* and SCAMIT Ed. 13 has 2 named species and 1 provisional species listed. *Phyllochaetopterus* sp A would be the 2nd provisional species when added in Edition 14.

References:

Blake, J. A. 1996. Family Chaetopteridae Malmgren, 1867. Pages 233-252. IN: Blake, James A.; Hilbig, Brigitte; and Scott, Paul H. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. Volume 6- The Annelida Part 3. Polychaeta: Orbiniidae to Cossuridae*. Santa Barbara Museum of Natural History. Santa Barbara.

Harris, L. 2017. NEP *Phyllochaetopterus* Character Table. *SCAMIT Handout*.

Hartman, O. 1960. Systematic Account of some Marine Invertebrate Animals from the Deep Basins off Southern California. *Allan Hancock Pacific Expeditions* 22(2): 69-215.

Nishi, E. & Rouse, G. W. 2007. A new species of *Phyllochaetopterus* (Chaetopteridae: Annelida) from near hydrothermal vents in the Lau Basin, western Pacific Ocean. *Zootaxa* 1621: 55-64.

Nishi, E. & Rouse, G. W. 2014. First whale fall chaetopterid; a gigantic new species of *Phyllochaetopterus* (Chaetopteridae: Annelida) from the deep sea off California. *Proceedings of the Biological Society of Washington* 126 (4): 287-298.

Read, G. & Fauchald, K. (Ed.) 2023. World Polychaeta Database. *Phyllochaetopterus* Grube, 1863. Accessed through: World Register of Marine Species at: https://www.marinespecies.org/aphia.php?p=taxdetails&id=129232 on 2023-04-12

SCAMIT. 1992. Notes from SCAMIT Workshop, 6/8/92, on the Chaetopteridae and Onuphidae Common Along the Southern California Shelf. *SCAMIT Newsletter* 11(2): 8.

SCAMIT. 2021. *A Taxonomic Listing of Benthic Marco- and Megainvertebrates from Infaunal & Epifaunal Monitoring and Research Programs in the Southern California Bight, Edition 13*. Cadien, D. B., Lovell, L. L., Barwick, K. L., Haggin, B. M., eds. 203pp.

SCAMIT. 2022. B'18 Problematic Polychaetes (12 April 2021). *SCAMIT Newsletter* 39(6): 5.

Other Literature Consulted:

Pasko, D. & Velarde, R. 1993. Key to the Chaetopteridae of Point Loma. *SCAMIT Handout*.

Version History:

Version 1.0—Draft voucher sheet created (09MAR2020)

Version 2.0—Voucher sheet completed, new images added and updated to new SCAMIT guidelines (04OCT2022)

Version 3.0—Updated name to *Phyllochaetopterus* sp A and author to SCAMIT, 2023 §; Added information on tube characteristics to Diagnostic Characters section; Updated References section; Updated names of co-occurring provisional species (12APR2023)

Voucher Sheet

B. Haggin
April, 2023

Species: *Syllis sp A* SCAMIT, 2023 §
Synonyms: *Syllis* sp LA4 Haggin, 2019 §

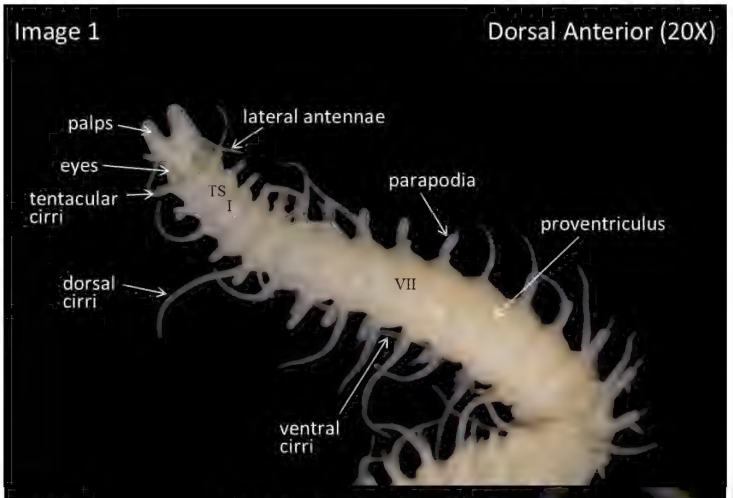
P-code—see Discussion
ITI-code—none assigned

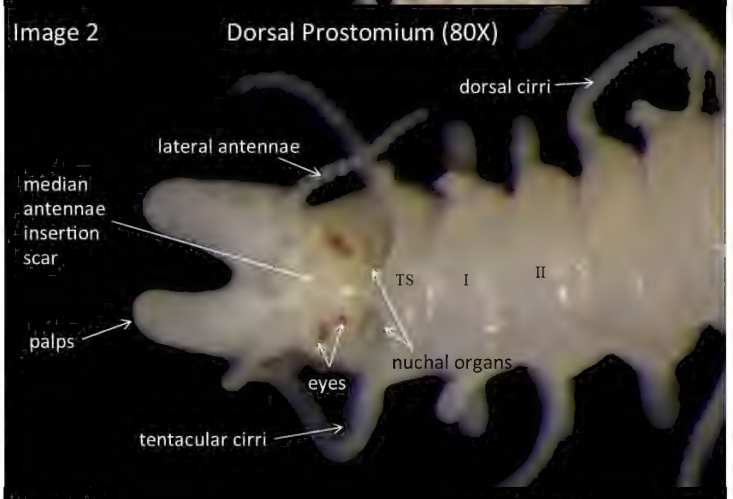
Subfamily: Syllinae
Family: Syllidae
Suborder: Nereidiformia
Order: Phyllodocida
Subclass: Errantia
Class: Polychaeta
Phylum: Annelida

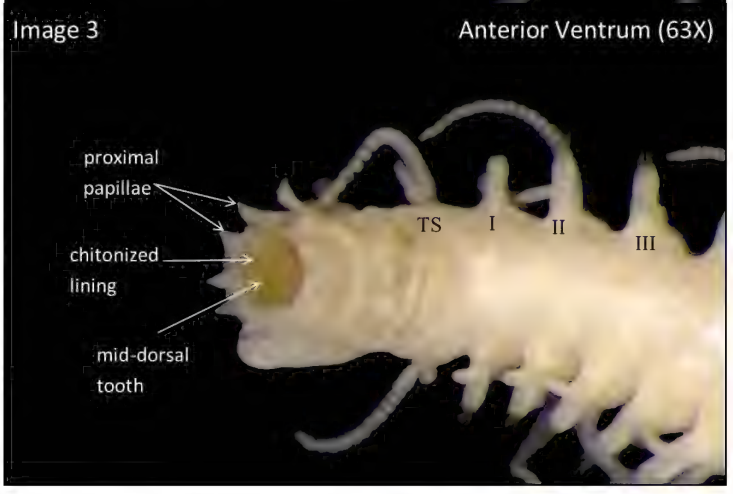
Diagnostic Characters:

~121 chaetigers long (complete); 26.4mm X 0.6mm (across proventriculus, without parapodia)

1) Prostomium ovoid, wider than long.
2) 2 pairs of eyes, anterior pair crescent-shaped, posterior pair round **(Images 1 & 2)**.
3) Median antennae inserted in middle of prostomium (broken, # or articles unknown).
4) Lateral antennae inserted anterior to 1st pair of eyes, near edge of prostomium (w/ 16-17 articles) **(Image 2)**.
5) Palps large, rounded apically, slightly fused basally (~25% longer than prostomium) **(Images 1 & 2)**.
6) Nuchal organs present on posterior of prostomium, lateral to anterior projection of peristomium **(Images 1 & 2)**.
7) Tentacular segment w/ medial anterior projection over posterior of prostomium **(Image 2)**.
8) Proboscis w/ mid-dorsal tooth anteriorly, 10 proximal papillae & a chitonized lining (not a trepan) **(Images 3 & 5)**.
9) Proventriculus from chaetiger 8, thru 6-7 chaetigers.
10) 2 pair of tentacular cirri—Dorsal pair w/ ~25 articles, ventral pair w/ ~16 articles **(Images 1 & 2)**.
11) Parapodia uniramous, elongate, w/ ventral cirrus inserted medially **(Images 4 & 7)**.
12) Dorsal cirri longest in first 15 chaetigers (w/ 29-37 articles), becoming uniform in length to posterior (w/ 14-16 articles).
13) Ventral cirri long, digiform. Extending beyond tip of parapodia but not beyond chaetae **(Images 4 & 7)**.
14) Anterior parapodia w/ 3-4 acicula (1-3 large & 1 small) & ~ 10 compound falcigers (both reducing in # posteriorly) **(Image 6)**.







Images 1-13 by B. Haggin
Images 14 & 15 by V. Rodriquez
(from *Syllis* (*Typosyllis*) sp SD1 voucher sheet)

Syllis sp A

SCAMIT, 2023 §

Voucher Sheet

B. Haggin

April, 2023

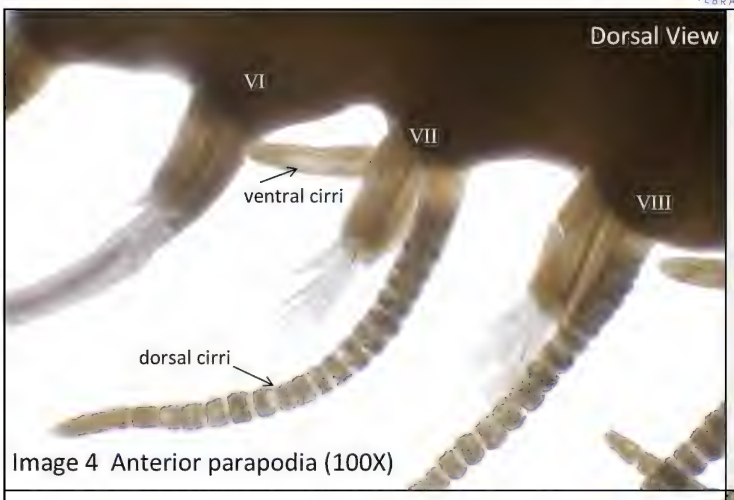


Image 4 Anterior parapodia (100X)

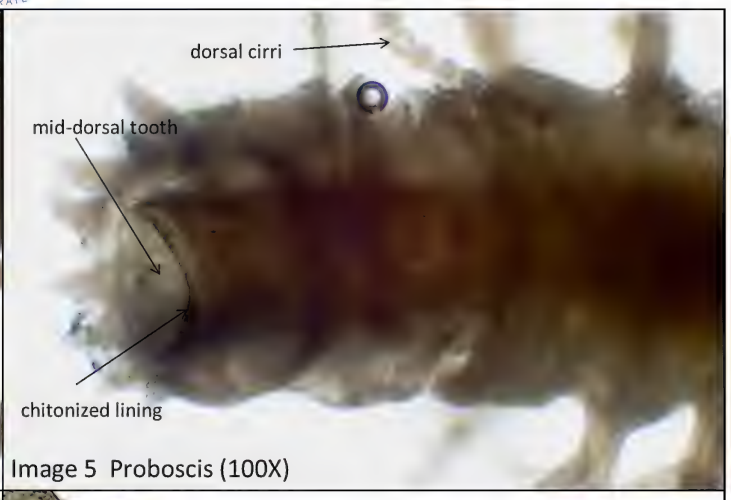


Image 5 Proboscis (100X)

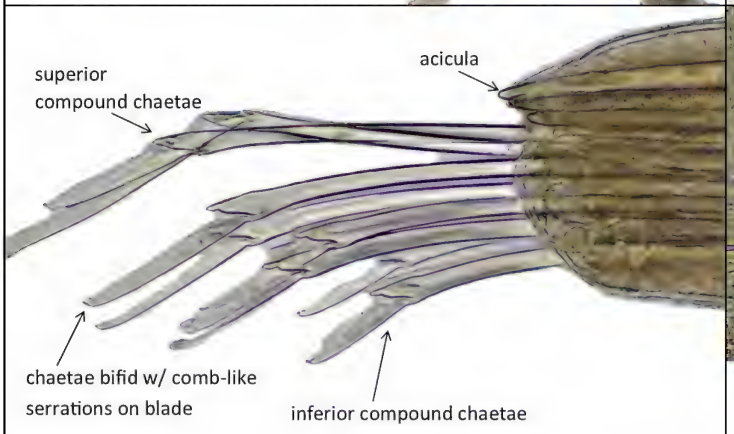


Image 6 Chaetiger 10 (400X)

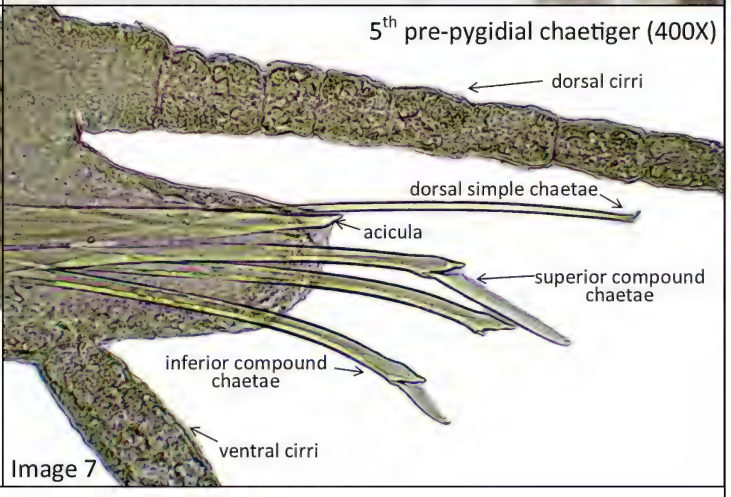


Image 7

Diagnostic Characters (cont.):

15) Acicula stout, unidentate (large) or distally expanded, knob-like (small) **(Image 6)**.

16) Compound falcigers distally bidentate, w/ comb-like serrations on blade; shafts w/ oblique, expanded joint w/ small spines on joint (superior blades ~3X longer than inferior blades w/in same fascicle) **(Images 6, 9 & 12)**.

17) Dorsal simple chaetae present only in last 5 chaetigers. Simple chaetae long, slender w/ unidentate tip (Tip may be frayed, appearing pilose) **(Images 7 & 8)**.

18) Ventral simple chaetae present only in last 4 chaetigers. Simple chaetae slender, slightly curved w/ bidentate tip and two small subterminal teeth, also with a larger, stouter chaetae just superior to ventral simple chaetae (similar in shape to shafts of compound falcigers, but ~3X's greater shaft diameter) **(Images 10, 11 & 12)**.

19) Pygidium a terminal ring, without papillae or cirri **(Image 13)**.

Pigmentation/MGS:

Preserved material white/ivory in color, without pigment or pigment pattern not evident. Tips of posterior ventral cirri (~last 25 chaetigers) retaining MGS. No other stain pattern evident.

Syllis sp A

SCAMIT, 2023 §

Voucher Sheet

B. Haggin

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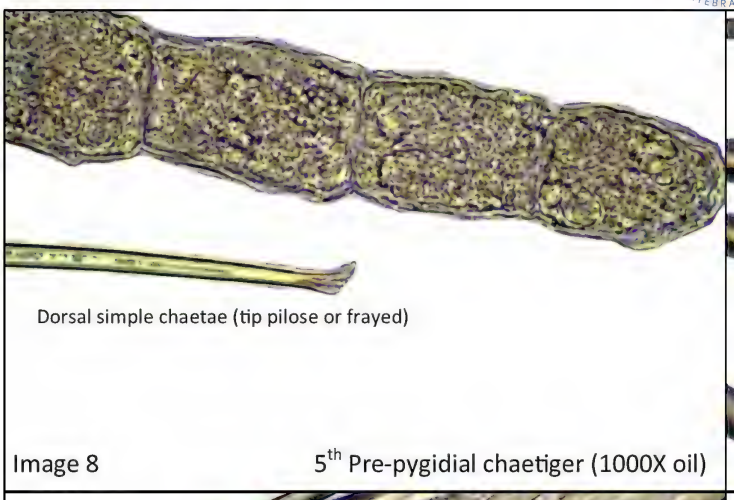
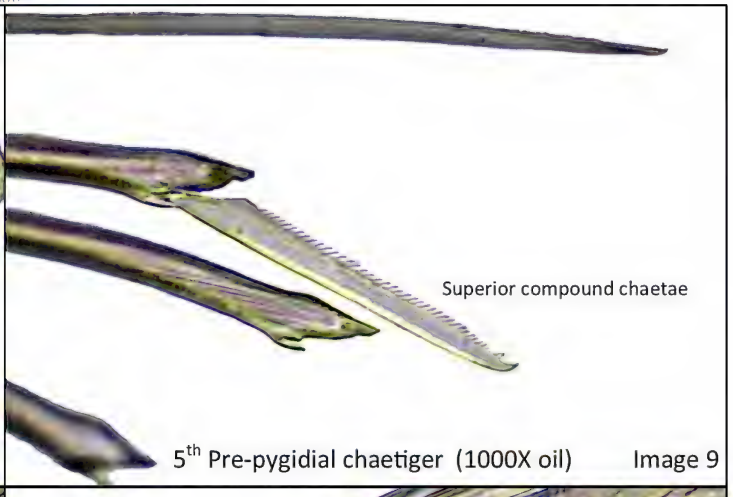


Image 8 — 5th Pre-pygidial chaetiger (1000X oil)



5th Pre-pygidial chaetiger (1000X oil) — Image 9

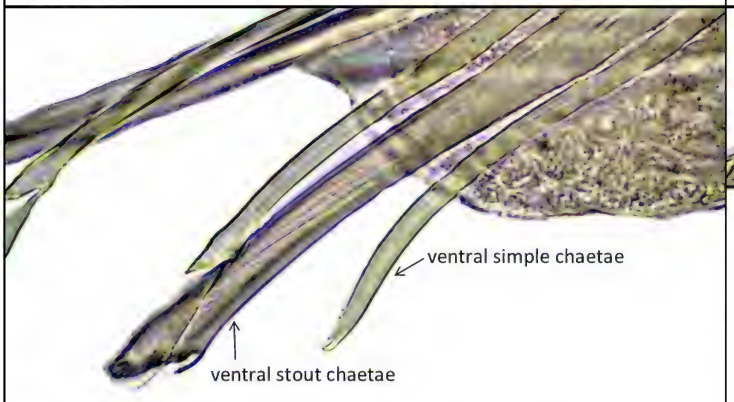


Image 10 — 4th Pre-pygidial Chaetiger (1000X oil)

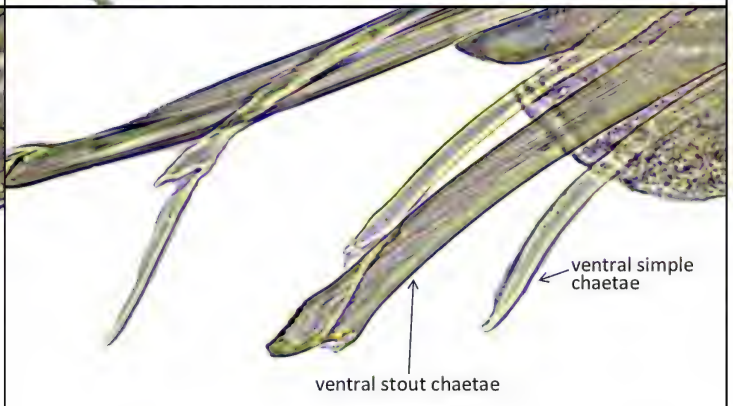


Image 11 — 4th Pre-pygidial Chaetiger (1000X oil)

Material Examined:

B'18-10362—San Pedro Channel, 745 m (33.63467N, 118.58360W—02AUG18) (1 ind.)

Similar Species:

Syllis alternata Moore, 1908 - *Syllis alternata* has dorsal cirri that alternate in length (# of articles 25 for long & 18 for short) throughout the body, *Syllis* sp A has dorsal cirri with a similar # or articles (14-16) throughout the body. The proventriculus of *Syllis alternata* starts in chaetiger 11 and is present thru 12 - 16 chaetigers, in *Syllis* sp A the proventriculus begins in chaetiger 8 and is present thru 7 chaetigers.

Syllis heterochaeta Moore, 1909 - *Syllis heterochaeta* has up to 7 acicula and 28 compound falcigers in anterior parapodia while *Syllis* sp A has up to 4 acicula and around 10 compound falcigers in anterior parapodia. The blades of the superior compound falcigers in *Syllis heterochaeta* are ~4X longer and more slender than the inferior blades, while the superior blades of *Syllis* sp A are ~3X longer and of equal width as the inferior blades. The inferior blades of *Syllis heterochaeta* often appear unidentate while *Syllis* sp A are definitely bidentate. The dorsal simple setae of *Syllis heterochaeta* begins in mid-body and the ventral simple setae are bidentate. The dorsal simple setae of *Syllis* sp A are present only in the last 5 setigers and the ventral simple setae are multidentate, with two apical teeth and two small subterminal teeth.

Syllis sp A

SCAMIT, 2023 §

Voucher Sheet

B. Haggin

April, 2023

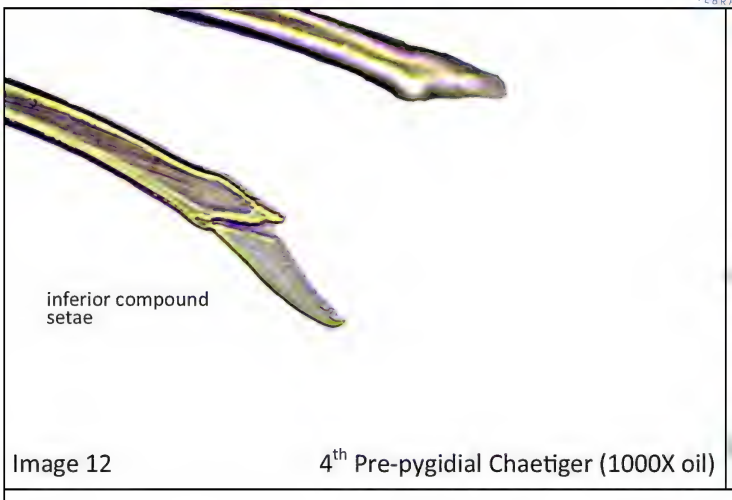


Image 12 — 4th Pre-pygidial Chaetiger (1000X oil)

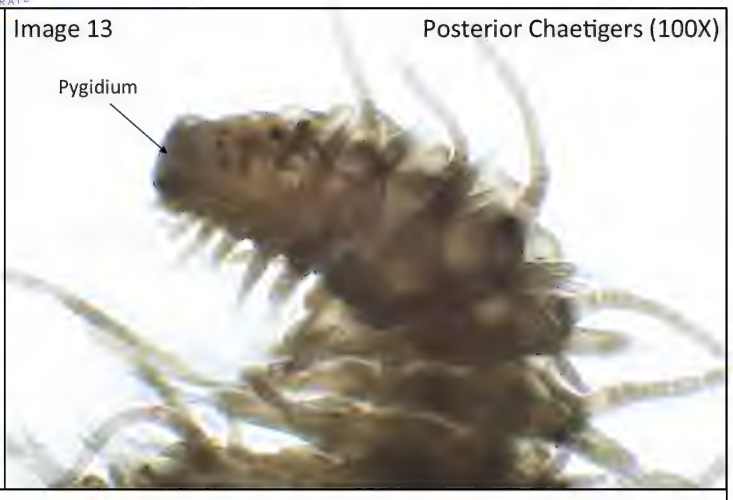


Image 13 — Posterior Chaetigers (100X)

Similar Species (cont.):

Syllis adamantea (Treadwell, 1914) - *Syllis adamantea* has compound falcigers that are unidentate, while *Syllis* sp A has bidentate compound falcigers. *Syllis adamantea* has a diamond-shaped pigment patch dorsally on each anterior chaetiger with a medial extension running to the parapodia. *Syllis* sp A lacks dorsal pigment. Syllis adamantea inhabits shallow water and can be found in soft-bottoms, rip-rap and pier pilings (L. Harris & T. Phillips pers. comm.).

Syllis hyperioni Dorsey & Phillips, 1987 - *Syllis hyperioni* lacks eyes while they are present in *Syllis* sp A. The superior blades of the compound falcigers in *Syllis hyperioni* are ~10X longer and more slender than the inferior blades. The superior blades of *Syllis* sp A are ~3X longer and of equal width as the inferior blades. The articulations of the tentacular cirri of *Syllis hyperioni* # 15(D) & 9(V) whereas the articulations of the tentacular cirri of *Syllis* sp A # 25(D) & 16(V).

Syllis gracilis Cmplx - The *Syllis gracilis* Cmplx is in need of revision but it does have ypsiloid (pseudocomposite) chaetae that are absent in *Syllis* sp A.

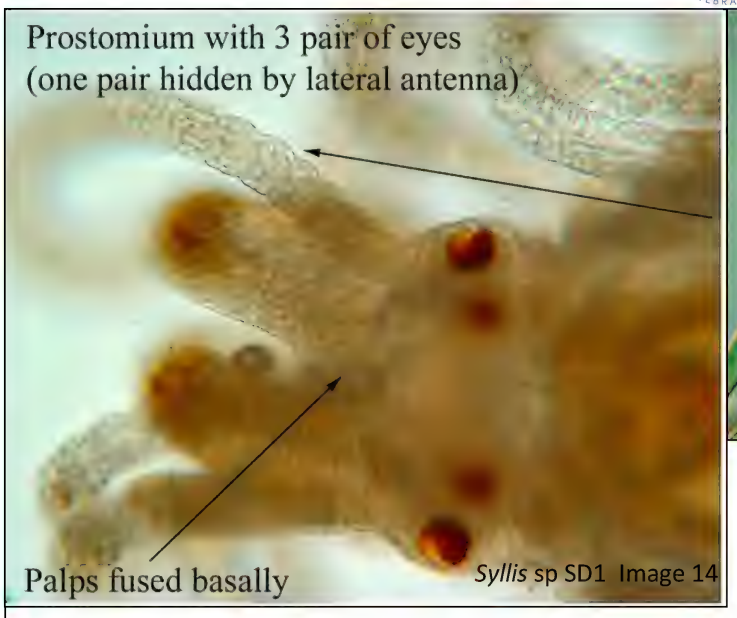
Syllis farallonensis (Blake & Walton, 1977) - *Syllis farallonensis* has short dorsal cirri (6-7 articles or less) throughout and indistinctly bidentate to unidentate compound chaetae while *Syllis* sp A has much longer dorsal cirri (at least 14 articles) and distinctly bidentate compound falcigers.

Syllis sp SD1 Rodriquez, 2008 § - *Syllis* sp SD1 is similar to *Syllis* sp A in having numerous articles in the dorsal cirri, 13-29 in *S.* sp SD1 and 14-37 in *S.* sp A, though it appears that *Syllis* sp SD1 irregularly alternates from short to long dorsal cirri throughout the body while *Syllis* sp A has consistently long dorsal cirri in the anterior chaetigers and consistently shorter dorsal cirri posteriorly. Both species have two pairs of large eyes visible, but *Syllis* sp SD1 actually has three pair (one pair hidden by the lateral antennae) in a lateral arrangement **(Image 14)** while *Syllis* sp A has only two pair in an anterior-posterior arrangement **(Images 1 & 2)**. Both *Syllis* sp SD1 and *Syllis* sp A have bidentate compound falcigers but *Syllis* sp SD1 have compound falcigers that are of near equal length within the same fascicle **(Image 15)** and *Syllis* sp A have compound falcigers ~3X longer than the shortest in the same fascicle **(Images 6 & 7)**. *Syllis* sp SD1 was originally described from 21 m near the US-Mexico border while *Syllis* sp A was found in 745 m in the San Pedro Channel.

Syllis sp A

SCAMIT, 2023 §

Voucher Sheet
B. Haggin
April, 2023



Habitat:

Syllis sp A is known from a single individual from deeper water in the San Pedro Channel. It was found in sediments of clayey silt from 745 m. Also collected in the sample were the polychaetes *Myriochele gracilis* Hartman, 1955; *Maldane californiensis* Green, 1991; *Protis pacifica* Moore, 1923; *Cossura rostrata* Fauchald, 1972; *Aricidea* (*Acmira*) *rubra* Hartman, 1963; *Levinsenia oculata* (Hartman, 1957); *Phyllochaetopterus* sp A SCAMIT, 2023 § (reported as *Phyllochaetopterus* sp LA1 Haggin, 2019 §); *Lepidonotus* sp A SCAMIT, 2023 § (reported as *Lepidonotus sp LA1* Haggin, 2019 §); *Harmothoe* sp LA1 Furlong, 2014 §; *Kirkegaardia* sp B SCAMIT, 2023 § (reported as *Kirkegaardia* sp LA1 Haggin, 2019 §); an unidentified syllid, an unidentified polynoid, and an unidentified *Cossura*.

Discussion:

Álvarez-Campos *et al*. (2015) defined the genus *Syllis* as: "Body sub-cylindrical. Palps basally fused. Distinctly annulate antennae and tentacular, anal, and dorsal cirri. Pharynx with a single tooth, located on anterior rim or slightly posteriorly, margin of pharynx with crown of soft papillae. Compound falcigerous chaetae, sometimes with pseudospinigers in some parts of body, thick pseudo-simple chaetae produced by blade-loss and shaft-enlargement or by shaft and blade fusion, only partial fusion in some species. Dorsal and ventral simple chaetae present. Reproduction by scissiparous schizogamy (one single stolon at a time)."

Currently, the P-Value Tool file states that all members of *Typosyllis* (except *T. farallonensis*, *T. heterochaeta*, and *T. hyperioni*) should be assigned P-Code "P494". Since the tool was created, *Typosyllis* has been shown to lack systematic validity since the species belonging to the group do not form a monophyletic clade (Álvarez-Campos *et al*., 2015; San Martín *et al*., 2017) and has been synonymized with *Syllis*. Only *Syllis gracilis* Cmplx has a P-Code listed explicitly for *Syllis* species and only applied to bays. I am not sure if this species should inherit P-Code "P494" from the *Typosyllis* group or if it should remain without a P-Code.

WoRMS currently lists 168 valid species of *Syllis*, though this number may not be accurate as they still have *Syllis farallonensis* accepted as *Typosyllis farallonensis* even though *Typosyllis* is accepted as a synonym of *Syllis*. SCAMIT Ed. 13 has 6 named species, including *Syllis gracilis* Cmplx. SCAMIT also recognizes at least 2 additional in-house provisional species of *Syllis* from City of San Diego that are not currently on the SCAMIT species list.

Syllis sp A

SCAMIT, 2023 §

Voucher Sheet
B. Haggin
April, 2023

References:

Álvarez-Campos, P., Riesgo, A., Hutchings, P. & San Martín, G. 2015. The genus *Syllis* Savigny *in* Lamarck, 1818 (Annelida, Syllidae) from Australia. Molecular analysis and re-description of some poorly-known species. *Zootaxa* 4052(2): 297-331.

Blake, J. A. & Walton, C. P. 1977. New Species and Records of Polychaeta from the Gulf of the Farallones, California. Pages 307-321. IN: Reish, D. J. & Fauchald, K. *Essays on Polychaetous Annelids in Memory of Dr. Olga Hartman*. The Allan Hancock Foundation, University of Southern California, Los Angeles.

Dorsey, J. H. & Phillips, C. A. 1987. A New Species of *Syllis* (*Ehlersia*) (Polychaeta: Syllidae) from Southern California, and Description of the Epitoke and Atoke Variation in *S.* (*Ehlersia*) *heterochaeta* Moore, 1909. *Bulletin of the Biological Society of Washington* 7:152-161.

Kudenov, J. D. and Harris, L. H. 1995. Family Syllidae Grube, 1850. pages 1-97. IN: Blake, James A.; Hilbig, Brigitte; and Scott, Paul H. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. 5 - The Annelida Part 2. Polychaeta: Phyllodocida (Syllidae and scale-bearing families), Amphinomida, and Eunicida*. Santa Barbara Museum of Natural History. Santa Barbara.

Moore, J. P. 1908. Some polychaetous annelids of the northern Pacific coast of North America. *Proceedings of the Academy of Natural Sciences of Philadelphia* 60:321-364.

Moore, J. P. 1909. The polychaetous annelids dredged by the U.S.S. "Albatross" off the coast of southern California in 1904. I. Syllidae, Sphaerodoridae, Hesionidae and Phyllodocidae. *Proceedings of the Academy of Natural Sciences of Philadelphia* 61:321-351, plates XV-XVI.

Read, G. & Fauchald, K. (Ed.) 2023. World Polychaeta Database. *Syllis* Lamarck, 1818. Accessed through: World Register of Marine Species at: https://www.marinespecies.org/aphia.php?p=taxdetails&id=129680 on 2023-04-12

Rodriquez, V. 2008. *Syllis* (*Typosyllis*) sp SD1 Voucher Sheet. *SCAMIT Handout*.

San Martín, G., Álvarez-Campos, P. & Hutchings, P. 2017. The genus *Syllis* Savigny *in* Lamarck, 1818 (Annelida: Syllidae: Syllinae) from Australia (second part): four new species and re-descriptions of twelve previously described species. *Zootaxa* 4237(2): 201-243.

SCAMIT. 2021. *A Taxonomic Listing of Benthic Marco- and Megainvertebrates from Infaunal & Epifaunal Monitoring and Research Programs in the Southern California Bight, Edition 13*. Cadien, D. B., Lovell, L. L., Barwick, K. L., Haggin, B. M., eds. 203pp.

Treadwell, A. L. 1914. New Syllidae from San Francisco Bay, collected by the U.S.S. "Albatross". *University of California Publications in Zoology* 13(9):235-238.

Other Literature Consulted:

Álvarez-Campos, P., Giribet, G. & Riesgo, A. 2017. The *Syllis gracilis* species complex: A molecular approach to a difficult taxonomic problem (Annelida, Syllidae). *Molecular Phylogenetics and Evolution* 109: 138-150.

Barwick, K. 2014. *Typosyllis* sp OC1 Voucher Sheet. *SCAMIT Handout*.

San Martín, G. 1992. *Syllis* Savigny *in* Lamarck, 1818 (Polychaeta: Syllidae: Syllinae) from Cuba, the Gulf of Mexico, Florida and North Carolina, with a revision of several species described by Verrill. *Bulletin of Marine Science* 51(2): 167-196.

San Martín, G. & Worsfold, T. M. 2015. Guide and keys for the identification of Syllidae (Annelida, Phyllodocida) from the British Isles (reported and expected species). *ZooKeys* 488:1-29.

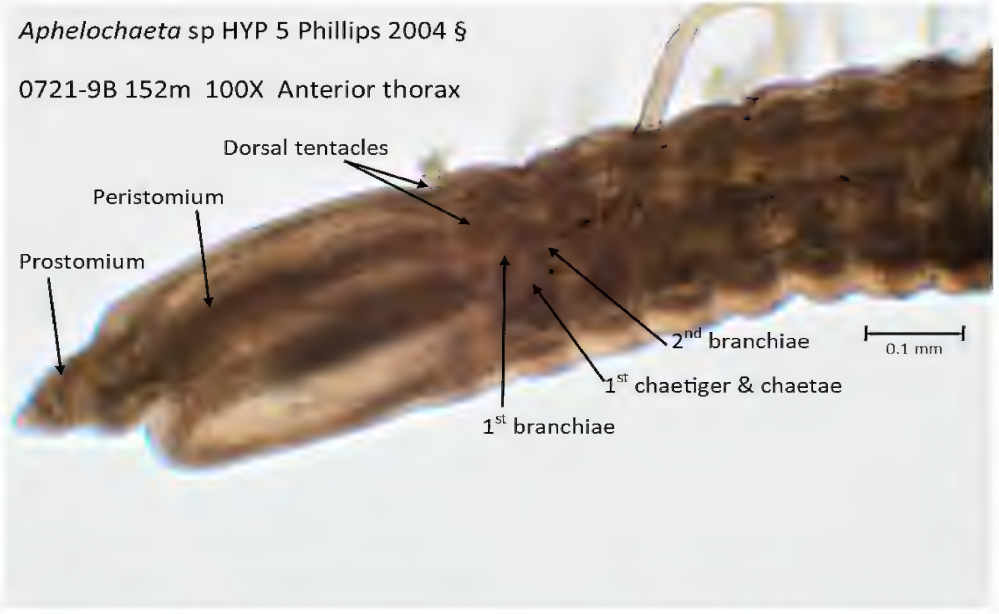
Version History:

Version 1.0—Voucher sheet created (01MAY2019)

Version 2.0—Updated format to conform to new SCAMIT guidelines; Updated name to *Syllis* sp A and author to SCAMIT, 2023 §; Updated Diagnostic Characters section; Updated Similar Species section; Updated images to remove image clutter and added Images 13-15; Updated References section; Added Habitat, Discussion and Other Literature Consulted sections; Added ITI-Code (12APR2023)

SOUTHERN CALIFORNIA ASSOCIATION OF MARINE INVERTEBRATE TAXONOMISTS

September–December 2022 SCAMIT Newsletter Vol. 41 No. 3-4



Antero-lateral view of *Aphelochaeta* sp Hyp5 Phillips 2004 § showing the insertion of the dorsal tentacles. Photo by B. Haggin

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The SCAMIT newsletter is not deemed to be a valid publication for formal taxonomic purposes

Publication Date: March 2024

12 SEPTEMBER 2022, EUNICIDAE, ZOOM

Attendance: Brent Haggin (LACSD); Ricardo Martinez, Veronica Rodriquez, Maiko Kasuya, Adam Webb (CSD); Leslie Harris (NHMLAC); Erin Oderlin, Greg Lyon, Jennifer Smolenski (CLAEMD); Angelica Zavala Lopez (MTS); Tom Biksey (Retired – Formerly of Don Reish Lab, CSULB); Erica Keppel, Smithsonian.

UPCOMING MEETINGS

Visit the SCAMIT website at: www.scamit.org for the most current meetings announcements.

There was no administrative business to discuss so Brent began the meeting with some responses to unresolved items from SCAMIT newsletter 39(6). The first was a question posed by Leslie, "Where have all the *Raricirrus* gone? Have we made the water too clean?" A review of LACSD benthic data showed that *Raricirrus maculatus* Hartman, 1961 was recorded regularly from 1972 to 1982, scattered along the Palos Verdes peninsula but with the majority of the records in the vicinity of the outfalls. Only 1 additional report from 2001 is in their records, 3 individuals from the outfall station. In 1984 the LACSD Joint Water Pollution Control Plant (JWPCP) implemented a Partial Secondary treatment and in 2003, a Full Secondary treatment. It would appear as though *R. maculatus* does prefer impacted sediments and the improved sediment quality is no longer favorable for this species.

The meeting moved on to a discussion of *Anotomastus gordiodes* (Moore, 1909) and a "honeycomb" methyl green stain (MGS) pattern observed by CLAEMD. Brent reviewed the *A. gordiodes* at LACSD, and photographed and documented the variability in thoracic chaetiger counts and chaetal arrangement, as well as MGS stain variation. The "honeycomb" pattern was captured and the group decided that "mottled" was a better description (Image 12 of attached *A. gordiodes* voucher sheet). A brief discussion on *A. gordiodes* is below.

Anotomastus is a monotypic genus erected by Hartman in 1947 to accommodate the species *Eunotomastus gordiodes* Moore, 1909 because it differed from the type species *Eunotomastus grubei* McIntosh, 1885 in the number of transitional thoracic chaetigers (1 in *Anotomastus* and 4 in *Eunotomastus*). Transitional thoracic chaetigers are defined as those with capillary notochaetae and hooded hooks or mixed fascicles in the neuropodia. *Eunotomastus* also has a complete first chaetiger whereas *Anotomastus* has an incomplete first chaetiger. The number of transitional thoracic chaetigers can also be used to help distinguish between *Pseudocapitella*, *Paracapitella* and *Anotomastus* as they all have a different number of transitional thoracic chaetigers.

The genus *Anotomastus* is described as having 17-18 thoracic chaetigers but a review of LACSD material shows worms with as few as 15 thoracic chaetigers and no transitional thoracic chaetigers (possibly juveniles). A review of *Anotomastus gordiodes* from San Diego Bay by Leslie (pers. comm.) also shows variation in the chaetal arrangement of the posterior thorax, with hooded hooks present from the 17th chaetiger, rather than the 18th, hooks in the last thoracic notopodia, capillary chaetae only or capillary chaetae present in the first abdominal notopodia.

Variation in the MGS pattern can also be seen within *Anotomastus gordiodes*. The thoracic stain is fairly consistent as far as which chaetigers stain intensely, but whether the stain is solid or speckled in the posterior thorax seems to be variable. The degree of abdominal banding is also highly variable, being either absent completely (B'13-9304—L. Harris, pers. comm., 21m off Santa Cruz Island, CA; B'18-10226—K. Barwick, pers. comm., 29m off Huntington Beach,

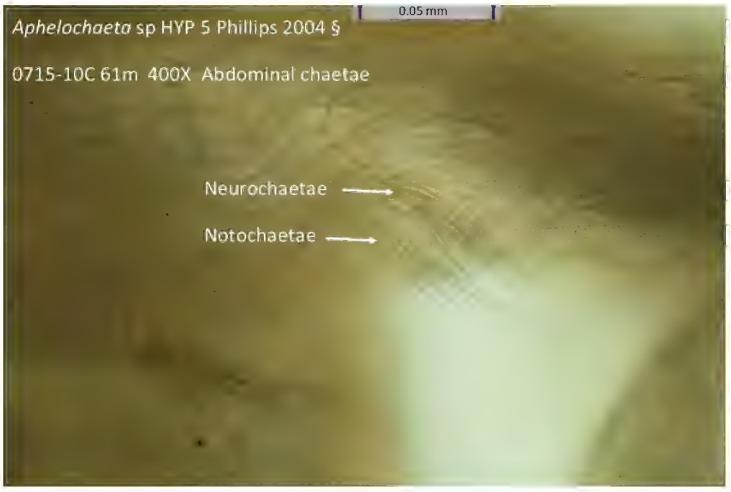
CA) to present, and ranging from faint to intense in LACSD samples (Images 8-11 & 13 of attached *A. gordiodes* voucher sheet).

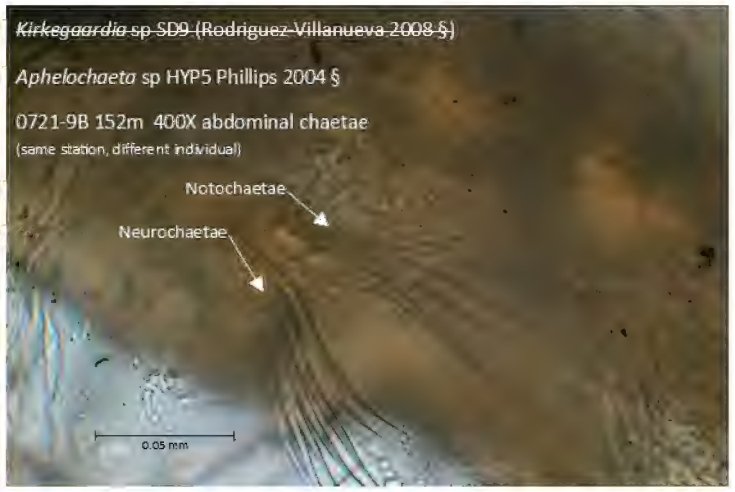
The type locality of *Anotomastus gordiodes* is San Diego, intertidal. Leslie has suggested that true *A. gordiodes* only occurs in shallow water and we perhaps have an additional species subtidally. An additional review of *A. gordiodes* specimens from throughout the SCB would be needed to assess this.

The final item from SCAMIT newsletter 39(6) was the discussion of *Aphelochaeta* sp HYP5 vs. *Kirkegaardia* sp SD9. Brent conducted a review of LACSD specimens and striking similarities between *Aphelochaeta* sp HYP5 Phillips, 2004 § and *Kirkegaardia* sp SD9 (Rodriguez Villanueva, 2008 §) were seen. General overall morphology, stain pattern, and shape of the abdominal chaetae (pictured below) have shown that, at least in the Los Angeles area, all previous LACSD reports of *K.* sp SD9 are actually *A.* sp HYP5. These individuals have abdominal neurochaetae that lack a distinct basal swelling, lack visible denticles at 400X magnification, are of nearly equal length as the notochaetae, all typical characteristics of the genus *Aphelochaeta*. The insertion of the dorsal tentacles is also on the anterior of chaetiger 1, another *Aphelochaeta* characteristic.

Blake (2019) emended the generic diagnosis of *Aphelochaeta* to be: "Prostomium conical to rounded; peristomium elongate with pair of grooved dorsal tentacles arising either on, or anterior to, setiger 1. Anterior segments often expanded, crowded or uncrowded; abdominal

segments sometimes beaded or moniliform in appearance; setae simple capillaries lacking distinct serrations using light microscopy but distinct fibrils may be visible using SEM; posterior end frequently expanded, tapering to a simple pygidial lobe."

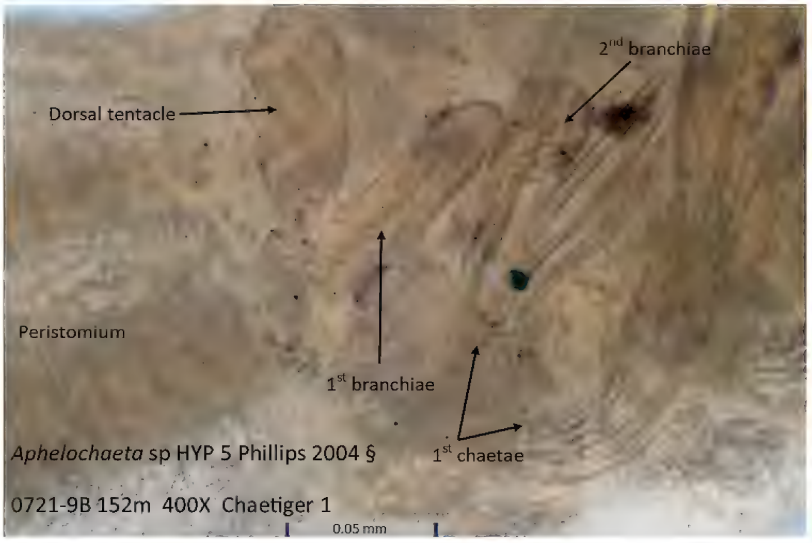




Blake (2016) replaced the genus *Monticellina* with the genus *Kirkegaardia* after discovering that *Monticellina* was preoccupied in the Platyhelminthes and redescribed the genus as: "Bitentaculate cirratulids with distinct body regions and all setae distally pointed. Pre-setigerous area typically elongate, cylindrical, with short, blunt prostomium and long peristomium with none to many weakly developed annulations; dorsal tentacles arising on posterior margin of peristomium, anterior to setiger 1. Thoracic notopodia often shifted dorsally, elevated, producing distinct dorsal groove along thoracic region; other species with thoracic parapodia more lateral, leaving broad elevated dorsum; parapodia of middle and posterior segments wider than long, somewhat crowded, with posterior most segments usually expanded or enlarged. Setae including simple capillaries with fibrils observed under SEM and denticulated capillaries with distinct denticles present along one edge of seta; denticles visible at 400-1000X; blades usually basally expanded."

Based on these descriptions, the best features for separating *Aphelochaeta* and *Kirkegaardia* are the chaetal structure and secondarily, the insertion of the dorsal tentacles. The dorsal tentacles are always inserted on the posterior of the peristomium in *Kirkegaardia* but can be on either the peristomium or chaetiger 1 in *Aphelochaeta*. The presence of denticles and basal swelling in the abdominal neurochaetae also are indicative of the genus *Kirkegaardia*. SCAMIT had previously established a 400X magnification threshold for determining the presence of denticles but according to Blake's generic diagnosis, up to 1000X is used to define species as is the case for *Kirkegaardia serratiseta* (Banse & Hobson, 1968) (Blake, 2016). It was decided during the meeting to maintain the 400X threshold for denticle determination for future provisional species but Blake's descriptions should be used to reliably identify currently described species. The methyl green stain patterns of the individual species can also be useful in aiding in the separation of the two genera once the individual species patterns are known.

Viewing the shape and dentition of the abdominal neurochaetae and the insertion of the dorsal tentacles (see cover photo and next page), clearly on the anterior of chaetiger 1, along with the stain pattern, *Kirkegaardia* sp SD9 should be locally synonymized with *Aphelochaeta* sp HYP5 and a detailed review of specimens from Orange County to San Diego should be made to determine if a complete synonymy is needed. A review of the images provided by Veronica during her Cirratulidae presentation in 2017 seem to show a similar stain pattern, abdominal



neurochaetae that lack basal swelling and clear denticulation, and are of nearly equal length to the notochaetae. The insertion of the dorsal tentacle is difficult to determine from the images.

The meeting then moved on to reviewing provisional voucher sheets.
Jasmineira sp LA1 Haggin 2019 § was originally collected in Bight '18 by LACSD from a single station in the San Pedro Channel (off the west end of Catalina Island) in 548 m. During the B'18 QC resolution, it was discovered that another individual was collected in CLAEMD B'18 samples from deeper water in Santa Monica Bay. It was determined that *J.* sp LA1 should be included in the next edition of the SCAMIT species list and should get a SCAMIT name designation. Update: This species has since been added to the SCAMIT Species List, Ed.14 as *Jasmineira* sp C SCAMIT 2023 § and the updated voucher sheet published in SCAMIT Newsletter 40(5). Brent will also prepare a stain-comparison with *Jasmineira* sp B SCAMIT 1986 §.

The next provisional voucher reviewed was *Kirkegaardia* sp LA1 Haggin 2019 §. This was another deep-water Bight'18 collected species. Numerous individuals from Santa Monica Basin and San Pedro Channel were collected from 738–883 m. It most closely resembles *Kirkegaardia cryptica* (Blake, 1996) having an elongated peristomium but differs in its stain pattern. It was determined that *Kirkegaardia* sp LA1 should be included in the next edition of the SCAMIT species list and should get a SCAMIT name designation. Update: This species has since been added to the SCAMIT Species List, Ed. 14 as *Kirkegaardia* sp B SCAMIT 2023 § and the updated voucher sheet published in SCAMIT Newsletter 40(5).

The final provisional voucher sheet reviewed was *Cossura* sp LA1 Haggin 2019 §. This was a single individual collected during Bight'18 from 745 m in the San Pedro Channel. After discussion during the meeting and further review, it was determined that this was actually *Cossura rostrata* Fauchald, 1972. Brent had counted his specimen as having 34 thoracic chaetigers. *C. rostrata* was described as having 19-21 thoracic chaetigers and 10-15 transitional chaetigers. Taking this into account, the 34 thoracic chaetigers counted in *C.* sp LA1 would fall into this range and changes in the MGS pattern correlate with the transitional chaetigers. The overall MGS pattern also agrees well with *C. rostrata*. Brent will update the voucher sheet with the new information and make it available. Brent will also prepare a comparison of stain patterns of the *Cossura* species encountered at LACSD.

Adam led the remainer of the meeting with a presentation on the Family Eunicidae, with a focus on *Marphysa sensu lato*. It is one of the largest polychaete families, with more than half of the species described prior to 1900. There are 29 described genera, 11 are considered valid and 6 are represented in the NEP. The Eunicidae are considered the sister group to the family Onuphidae. They have 1-5 antennae and may have peristomial cirri present or absent. They are tubiculous or free-living, and are carnivorous, herbivorous or scavengers.

Marphysa, as a group, lack peristomial cirri and possess branchiae. Fauchald had separated *Marphysa* into 5 groups based on characteristics of the composite chaetae, while Grube had suggested separating *Marphysa* into 2 groups based on branchial distribution. Molina Acevedo (2018) split *Marphysa* and erected a new genus, *Paucibranchia*, for species with a limited branchial distribution and an MI with a rounded falcal arch. Species with branchiae throughout and an MI with a rectangular falcal arch remained in *Marphysa*. Locally identified species of *Marphysa mortenseni* Monro, 1928 should be given a provisional designation and identified as such in the future based on characteristics of the dentition of MII and MIII.

With the recent split of *Marphysa*, a question was raised regarding *Marphysa* sp B SCAMIT 1999 §. Based on its branchial distribution and MI characteristics, this species should be retained within *Marphysa*. Leslie also has a personal provisional species, *Marphysa* sp B from San Diego Bay, that differs from the *Marphysa* sp B currently on the SCAMIT list. Adam has a character table for the local *Marphysa* that will be updated with all the local provisional species.

Leslie shared images of *Leodice lucei*. It has a mottled dark-red appearance anteriorly that fades rapidly to a brown/cream color posteriorly. This species is associated with hard substrates so may not be encountered during routine monitoring.

A question about the Flabelligeridae was asked - "How does Sergio Salazar-Vallejo define ankylose vs. pseudocompound?" Ankylose chaetae possess a stiff joint caused by fusion, whereas pseudocompound chaetae have a distinct shaft and blade.

The meeting concluded with choosing the provisional vouchers to be reviewed in the next meeting: *Syllis* sp LA4, *Dispio* sp SD1, *Phyllochaetopterus* sp LA1, *Chaetozone* sp LA2 and *Lepidonotus* sp LA1. The topic for the next polychaete meeting was also decided and it will cover problematic polychaete groups *Syllis* and *Eusyllis*, *Parasabella*, *Prionospio* and potentially others.

17 OCTOBER 2022, POLYCHAETES, ZOOM

Attendance: Brent Haggin, LACSD; Leslie Harris, NHMLAC; Ricardo Martinez, Veronica Rodriguez, Adam Webb, Maiko Kasuya, CSD; Erin Oderlin, Greg Lyon, Jennifer Smolenski, CLAEMD; Ashley Loveland, Diane O'Donohue, Jessica Donald, SFPUC; Bill Furlong, MBC; Ernie Ruckman, OCSD; Kelvin Barwick, OCSD-Retired; Dany Burgess, Washington State Dept. of Ecology; Tony Phillips, DCE; Erica Keppel, Smithsonian.

The meeting began with an impromptu discussion on the differences between *Aphelochaeta petersenae* Blake, 1996 and *Aphelochaeta* sp B SCAMIT, 2015 §. The key differences are in the stain patterns and an expansion of a few thoracic chaetigers in *A.* sp B that is not present in *A. petersenae*.

Veronica provided a brief review of her provisional species *Dispio* sp SD1 Rodriguez Villanueva 2018 §. Its closest congener *Dispio uncinata* Hartman, 1951

has multiple dorsal papillae on the first chaetiger that are lacking on *D.* sp SD1. Veronica will work on updating the provisional voucher sheet to conform with the new SCAMIT guidelines.

Brent then led a review of some of his provisional species. The first was *Lepidonotus* sp LA1 Haggin, 2019 §. *L.* sp LA1 was a deep-water species collected during Bight'18 from 745 m. It is most similar to *Lepidonotus spiculus* (Treadwell, 1906) but *L. spiculus* has polygonal basal plates on the elytra that are absent on *L.* sp LA1. Addtionally, *L. spiculus* is known from shallower water (84-126 m) and is found locally on hard substrates. *L.* sp LA1 was elevated to *Lepidonotus* sp A SCAMIT, 2023 § and the voucher sheet was published in Vol. 41, no. 1-2.

The next provisional species was *Syllis* sp LA4 Haggin, 2019 §. It is another deep-water species collected during Bight'18 from 745 m. *S.* sp LA4 is different from other local *Syllis* species based on the combination of articles in the antennae, tentacular cirri and dorsal cirri, the location of the proventriculus, and the lengths of the blades of the compound falcigers. This species was elevated to *Syllis* sp A SCAMIT, 2023 § and the voucher sheet was published in SCAMIT Newsletter Vol. 41, no. 1-2.

This led to a discussion of local shallow water *Syllis* after Bill Furlong (MBC) told us about a strange specimen from around 9 m off Ventura. His specimen had few articles and unidentate blades in the compound falcigers. Bill was directed to *Syllis farallonensis* (Blake & Walton, 1977) as a likely suspect. *Syllis adamantea* (Treadwell, 1914) was also suggested but Leslie pointed out that *S. adamantea* was one of the few syllids that have and retain pigment. Tony and Leslie noted that *S. adamantea* is typically found locally in shallow water associated with rip-rap and pier pilings.

The next species was *Phyllochaetopterus* sp LA1 Haggin, 2019 §. It was collected during Bight'18 from deep water (745-883 m). *P.* sp LA1 is most similar to *Phyllochaetopterus limicolus* Hartman, 1960 due to its lack of eyes, and number of chaetigers in Regions A and B. It can be distinguished from *P. limicolus* by its ventral pigment pattern in Region A. This species was elevated to *Phyllochaetopterus* sp A SCAMIT, 2023 § and the voucher sheet was published in SCAMIT Newsletter Vol. 41, no. 1-2.

The final provisional species reviewed was *Chaetozone* sp LA2 Haggin, 2019 §. It was also collected from deep water (818 m) during Bight'18. *C.* sp LA2 is most similar to *Chaetozone hartmanae* Blake, 1996 based on the different types of spines in the notopodia (straight) and neuropodia (curved). The two differ in the start of the spines (chaetiger 8 for *C.* sp LA2 and 33 in *C. hartmanae*) and the stain patterns. Leslie also pointed out that *C. hartmanae* was arched in the thorax and the parapodia were dorsally displaced due to this arch. Tony pointed out that the spines of *C. hartmanae* were orange in color and with slight serrations distally. *C.* sp LA2 was elevated to *Chaetozone* sp D SCAMIT, 2023 § and the voucher sheet was published in SCAMIT Newsletter Vol. 40, no. 5.

A question was raised by Brent about the inheritance of P-codes and ITI-codes from species that new provisional species might have been identified as in the past. This discussion was moved to an agenda item for the upcoming Species List Review Committee meeting.

Leslie Harris led the remainder of the meeting on some problematic polychaetes. The discussion began with characters used to separate *Syllis* and *Eusyllis* species. *Syllis* species have a definite articulation to the antennae and cirri, and unfused palps. *Eusyllis* have a partial fusion to the palps and a pseudo-articulation to the antennae and cirri. Species of *Eusyllis* can vary to the degree

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of articulation in the anterior, ranging from smooth throughout to pseudo-articulated anteriorly changing to smooth posteriorly.

The discussion then moved to that of *Parasabella*. Leslie shared a recent paper by Keppel *et al* (2020), *Re-description of Parasabella fullo (Grube, 1878) (Polychaeta: Sabellidae) and diagnostic characteristics for detection in California.* This paper also includes a key to species of *Parasabella* from California. Leslie then shared some images of two local *Parasabella* collected from San Diego Bay. The first was *Parasabella rugosa* (Moore, 1904). The rugosity of the ventral surface is easily seen and is distinctive. Leslie collected this specimen on a settling plate. This species is not common and has only a few recent records. Leslie suggested that this may be a warm water species or possibly introduced, but Dany Burgess (Washington State, DoE) stated that they find *P. rugosa* in Puget Sound in coarse gravel so Leslie's warm water theory may not hold water.

The next images were of *Parasabella fullo* (Grube, 1878). This organism is darkly pigmented dorsally when alive but the pigment fades rapidly once preserved. The radioles are heavily speckled and this speckling typically remains after preservation. *P. fullo* is found mostly in harbors and marinas, though Kelvin Barwick (OCSD-retired) stated that they did collect one from 16 m offshore during Bight'13.

The topic then moved to the local species of *Prionospio*. *Prionospio jubata* Blake, 1996 has 4 pairs of branchiae, the 1st and 4th pair pinnate, the fourth slightly longer than the first. It also has dorsal crests from chaetiger 6. *P. jubata* was described from material collected from Santa Maria Basin, Santa Barbara Channel and San Diego.

Prionospio dubia Day, 1961 has 4 pairs of branchiae, the 1st and 4th pair pinnate, the first much longer than the fourth. *P. dubia* was originally described from South Africa but has since had its range increased to include the North Atlantic Ocean, Mediterranean Sea, North Sea, Australia, Japan and California. Blake (1996) made his local ID's based on similar stain patterns with *P. dubia* from the Western Atlantic and not from the type locality. This species is either highly invasive or a cryptic species complex and local records should be re-evaluated.

Prionospio ehlersi Fauvel, 1928 has 4 pairs of branchiae, the 1st pair pinnate, and interparapodial pouches from chaetigers 4/5. Maciolek (1985) synonymized *Prionospio lobulata* Fauchald, 1972 with *P. ehlersi* and was followed by Blake (1996). *P. ehlersi* was originally described from the Indian Ocean and Leslie expressed that this synonymy was unlikely to be correct. SCAMIT has switched back to *P. lobulata* for NEP worms effective with SCAMIT Species List, Ed. 14.

Prionospio lighti Maciolek, 1985 was originally described from material collected from Washington to Central California in bays or shallow water (to 38 m). *P. lighti* has 6-12 pairs of apinnate branchiae, each branchiae 2-3 chaetigers long. Blake (1996) based his illustrations off a few specimens from around 150 m and show them with branchiae around 7-8 chaetigers long. Blake (1996) also expanded the depth range from the intertidal to 600 m. Leslie only uses *P. lighti* for specimens that match Maciolek's description, with branchiae 2-3 chaetigers long. The long branchiae form illustrated by Blake is likely an undescribed species and if encountered should be treated as a provisional species. The large range in branchial number (6-12) and the wide geographic range of samples used in the original description suggest that *Prionospio lighti* represents a west coast species complex. A detailed review of *P. lighti* from the North American west coast would be needed to separate the potential cryptic species contained within.

Prionospio multibranchiata Berkeley, 1927 was originally described from Vancouver Island, British Columbia, Canada in shallow water. Berkeley and Berkeley (1942) subsequently synonymized *P. multibranchiata* with *Prionospio cirrifera* Wirén, 1883 and this was supported by Foster (1971). Maciolek (1985) re-instated *P. multibranchiata* as valid based on the presence of very large eyes and subsequently restricted the distribution of *P. cirrifera* to arctic Europe. *P. multibranchiata* has 7-11 (usually 8-9) pair of apinnate branchiae and large eyes. Leslie stated that some spionids become epitokous when spawning, and while the morphological changes are not as drastic as those seen in nereids and syllids, they do develop very large eyes. The similarities with *P. lighti* and the similar type localities suggest that *P. multibranchiata* may be an epitokus *P. lighti* but genetic analysis may be needed to resolve this issue. Dany Burgess expressed that this is not a common species in the Puget Sound.

Prionospio steenstrupi Malmgren, 1867 is another *Prionospio* species described from Europe and subsequently reported from most of the northern hemisphere. *P. steenstrupi* has 4 pairs of branchiae, the 1st and 4th pair pinnate, the first about equal to the fourth, and chaetiger 2 has a ventral process to the neuropodial lobe. Gopal et al. (2020) provided a table of characters of all species of the *P. steenstrupi* group in their supplemental material and may be helpful if an animal with these characteristics is encountered. Leslie expressed that true *P. steenstrupi* is likely not found in the NEP.

Leslie then discussed her provisional species *Prionospio* sp J Harris, 2014 §. *P.* sp J most closely resembles *P. jubata* but *P.* sp J has a striking stain pattern on the dorsum, sides and ventrum, larger notopodial lamellae, and the dorsal crest begins on chaetiger 9 rather than on chaetiger 6. *P.* sp J has been collected in Santa Monica Bay from 60 m. Leslie also provided comparison images of the stain patterns of *P.* sp J, *P. jubata* and *P. dubia.*

Prionospio newportensis Reish, 1959 was reinstated by Delgado-Blas (2014). *P. newportensis* has 5 pairs of branchiae, 1st, 4th & 5th pinnate, the first pair longest. It was originally described as a subspecies of *Prionospio heterobranchia* (Moore, 1907) and was placed in synonymy with it by Foster (1971). This synonymy was upheld by Maciolek (1985) but she did not examine the type material. Delgado-Blas (2014) restricted the range of *P. heterobranchia* to the northwestern Atlantic and reinstated *P. newportensis* based on its lack of dorsal ridges, size of the first notopodial lamellae, and start of the notopodial hooded hooks. *P. newportensis* is from shallow water in Newport Bay and this name should be used going forward. The next edition of the SCAMIT species list will reflect this change.

Prionospio pygmaeus Hartman, 1961 was not discussed.

The next topic of discussion was a comparison of *Glycinde picta* Berkeley, 1927 and *Glycinde* sp SF1 Norris, 2006 §. *G.* sp SF1 has a greenish-yellow hue to the body, 2 types of proboscidial papillae (1 row duck feet and 1 row cigar-shaped) in region 5, some bifid papillae in region 2 and ventral micrognaths absent. *G. picta* has a distinct dorsal and ventral pigment, 1 type of proboscidial papillae (2 rows of duck feet) in region 5, papillae in region 2 are not bifid and ventral micrognaths are present. The cigar-shaped papillae in *G.* sp SF1 have a distinct pore at the tip. Micrognaths develop with size so their presence/absence are not a reliable character for smaller individuals. The best way to separate the two species is by checking region 5 for the types of proboscidial papillae. Methyl green or Shirlastain A can be used to enhance the papillae. Leslie also provided a table of characters to the *Glycinde* of the NEP.

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A few ampharetids from the SFPUC lab were reviewed next. They have been recording *Amphicteis* specimens similar to *Amphicteis scaphobranchiata* Moore, 1906 but that have more than 1 pair of foliose branchiae. The new provisional *Amphicteis* sp SF1 has rudimentary notopodia in the abdomen, with the first few the most distinct. *A.* sp SF1 also has a middle pair of branchiae that are expanded and ciliated. If branchiae are missing, the difference in prostomial stain can help to differentiate *A. scaphobranchiata* and *A.* sp SF1. Jirkov (2018) described a new species of *Amphicteis* from the polar region with more than one pair of foliose branchiae but it does not match with *A.* sp SF1. The number of foliose branchiae is important taxonomically and this character should be examined more closely. Leslie provided a table of characters for *Amphicteis* of the NEP.

Amparete acutifrons (Grube, 1860) was originally described from Greenland and bays of the north Atlantic but its range has since expanded to the Mediterranean Sea, North Atlantic and eastern United States, Bearing Sea to Japan and central to southern California, and based on a single specimen from Pioneer Canyon, Halfmoon Bay, California (Hilbig, 2000) to a depth of 1400 m. Leslie expressed that we do not have true *A. acutifrons* here on our coast, but actually 2 undescribed species. True *A. acutifrons* has dorsal cirri present from the last two thoracic chaetigers and all abdominal chaetigers. A northern (Puget Sound region) provisional species *Ampharete* sp N1 NAMIT, 2013 § have dorsal cirri in the posterior thorax as blunt superior processes. A southern (San Francisco to San Diego) provisional species *Ampharete* sp SF1 § has dorsal cirri from thoracic chaetigers 1-2, elongating on thoracic chaetigers 8-9 and elongating again on the 5th abdominal chaetiger. The deep-water form identified by Hilbig (2000) likely represents a third provisional species. Provisional voucher sheets for both species will be made in the future and these name changes are expected to be included in the next edition of the SCAMIT species list. Leslie provided a table of characters for *Ampharete* of the NEP.

The final topic of discussion was of *Eumida longicornuta* and the general problem with phyllodocid taxonomy. Parker (1995) placed into synonymy most of Hamilton's (1976) provisional species or changed their generic designations. Leslie has requested the samples from LACSD to re-evaluate the synonymies proposed by Parker.

24 OCTOBER 2022, SLRC, ZOOM

Attendance: Brent Haggin, Don Cadien, Jovairia Loan (LACSD); Veronica Rodriguez, Wendy Enright, Zoë Scott, Katie Beauchamp, Andrew Davenport (CSD); Erin Oderlin, Greg Lyon, Jennifer Smolenski (CLAEMD); Ben Ferraro (OCSD); Kelvin Barwick (OCSD - Retired); Leslie Harris (NHMLAC); Dean Pasko, Tony Phillips (DCE).

Kelvin began the meeting with a brief review of the progress of the Provisional Species Review. The majority of the meeting then moved to the topic of Don's SCAMIT List - Species Tracking Sheet. This sheet came about as a consequence of Tim Stebbins inquiring about collection information for a species that was on the SCAMIT Species List, and ultimately, why it was initially added to the list. Don's proposal for a Species Tracking Sheet was based on a format used by WoRMS and aims to serve as a way to document changes proposed and made for each species on the SCAMIT Species List. The document contained the species name, taxonomic heirarchy, when it was added to the SCAMIT species list, why it was added, synonyms, basionyms, comments on its current generic placement, current disposition, who edited the page and references. The document would track who made changes to the document, but not what changes were made. The process is time intensive as it requires a manual search of each edition of the

Species List to determine the timing of a species' initial inclusion. Addtionally, often a knowledge of historical nomenclature is needed to find a species as it was originally listed.

Dean noted that the Species Tracking Sheets demonstrated by Don did not address the initial query of primary collection information justifying a species inclusion on the List. Part of the problem lies in how the SCAMIT Species List was originally generated. The early editions of the list were compiled mostly thru species lists of the various agencies and collection information was not well documented. Even now the emend list usually only states an agency, or Bight program, and a collection year for a newly added species but not an actual station and depth.

Questions about the detail of the taxonomic hierarchy were raised and it was decided that it should contain all of the levels recognized within the SCAMIT Species List. It was decided that additional comments on the sheet could be listed under the comments on generic placement. It was recommended that distributional data could also be added to the sheets to act as a quick synoptic data review across agencies but this idea did not seem to gain much traction. Species currently on the List that become synonymies would require a new sheet for the new species name and the current species would have its disposition updated on its sheet to show it as a synonym of the new species.

A question was raised as to how much this duplicated the effort by WoRMS. Don replied that WoRMS does not handle provisional species at all and we are not always in agreement with WoRMS in the treatment of each species. Dean had also mentioned that historically, voucher sheets were created for all species, not just provisional species, where much of this information could be found. Don mentioned that Species Sheets were created as a way to collect information on a species but which was not required for inclusion on the SCAMIT Species List. Leslie mentioned that SCAMIT meetings began as round-robin species exchanges in an effort to standardize name usage. The material presented in early SCAMIT newsletters reflects this.

A question was also raised as to what to do with the sheets after they were created? It was decided that they would mostly be used as reference material for the species list review committee and that the labor intensive chore of updating the sheets would likely fall to the SLRC during updates to the Species List. It was also decided that the sheets could be shared openly with all SCAMIT members and with outside individuals upon request. Storage of the Species Sheets was another question raised during the meeting. It was agreed that ultimately having this information linked to the species in a database would be the most beneficial.

Some questions and objections were raised to the proposal, such as - the time and effort required to complete the task for all species and synonyms on the SCAMIT Species List; the continued maintenance; the needed level of cladistic and taxonomic experience of those involved; the project being beyond the scope of SCAMIT even though the information would be useful. It was recommended that if it was decided to put forth the effort, that it should be done with the ultimate intention of publication in a scientific journal.

The meeting resolved with a brief discussion of P-codes. It was mentioned that there has been increased interest from regulators in updating the standardization of P-codes. The topic was added to the discussion for the December 2022 SLRC meeting.

NOVEMBER 2022 – MEETING CANCELED

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05 DECEMBER 2022, SLRC, ZOOM

Attendance: Brent Haggin, Don Cadien, Jovairia Loan (LACSD); Veronica Rodriguez, Wendy Enright, Zoë Scott, (CSD); Erin Oderlin, Greg Lyon, Jennifer Smolenski, Cody Larsen (CLAEMD); Ben Ferraro (OCSD); Kelvin Barwick (OCSD - Retired); Leslie Harris (NHMLAC); Marie Nydam (SOKA University).

Kelvin began the meeting with a discussion of the WoRMS match list. He recommends using the list as a starting point for the emendation process. The WoRMS match list is good for catching spelling or hierarchy changes. Zoë mentioned that she wrote an R-script that also evaluates the higher level taxonomy automatically between WoRMS and the SCAMIT Species List. Don's species tracking sheets can also be a good source for documenting differences and justifications.

The provisional species review progress was discussed next. Provisional species currently residing on the SCAMIT Species List but lacking proper supporting documentation should be removed to the Hold-List and documented for inclusion in an appendix that will be added to Edition 14 of the Species List to help track provisional and other species that are being removed from the List. The topic arose of whether organisms should be included if they are reported by reputable organizations but not by SCAMIT members. It was decided to add this subject to the December 2022 All-Hands meeting agenda.

Don's species tracking sheets were next on the agenda and the new templates for the sheets were evaluated. It was decided that the headers should be moved from rows to columns for easier database uploading in the future.

The Database committee discussed its current progress. Cody discussed the ITIS framework and how it could be used for our needs. He has a stripped-down version to use for design and testing purposes. Using this framework would reduce the need for an outside consultant to develop the database and would allow SCAMIT to host the database on SCAMIT.org. It would require an additional SCAMIT position to be added, Database Manager, and an experienced Web Designer would be needed as a consultant/developer to assist in building the user interface.

BRI and P-codes were also briefly discussed and were added as a roundtable discussion item on the December 2022 All-Hands meeting agenda.

12 DECEMBER 2022, SCAMIT ALL-HANDS, ZOOM

Attendance: Greg Lyon, Erin Oderlin, Craig Campbell, Joanne Linnenbrink, Jennifer Smolenski, CLAEMD; Rob Gamber, Ben Ferraro, OCSD; Tony Phillips, DCE; Zoë Scott, Wendy Enright, Megan Lilly, Adam Webb, Ricardo Martinez, Maiko Kasuya, Andy Davenport, Stephanie Smith, Lauren Valentino, CSD; Shelly Walthers, Brent Haggin, Don Cadien, Cody Larsen, Terra Petry, Jovairia Loan, Norbert Lee, Amber Von Tungeln, LACSD; Matt Hill, EcoAnalysts; Austin Hendy, NHMLAC; Kelvin Barwick, Bill Furlong, Robin Gartman, Retired.

<u>President, Brent Haggin</u>

Opening remarks: Brent reviewed the year's meetings and thanked external experts for being guest speakers.

Voucher sheet database: It is progressing well. Over the summer the voucher sheet guidelines and criteria for acceptability to SCAMIT List were updated. There were 18 new sheets

uploaded with most of them being legacy provisionals that had information added allowing them to meet the new guidelines. A new voucher sheet that made it all the way through the process was *Glycera* sp LA1 Parker 1999 § and it will be given the SCAMIT designation *Glycera* sp B SCAMIT 2022 § .

Speciesl List Review Committee Chair, Kelvin Barwick

Kelvin gave a presentation on the SLRC's activities for 2022. Ed 14 is on target for pulication 1 July 2023. This year the committee was focusing on trying to align with WoRMS as much as possible. They are continuing the review of all provisional species currently on the List. There are 390 provisionals in Ed 13. It is a significant amount of work as it requires a line by line search to check for sufficient documentation on SCAMIT.org. Kelvin clarified that when he refers to a species being "removed" it means it will go to the Hold List but is not deleted entirely. The SLRC is not looking to prevent labs from using in-house provisional species names, those species just won't be included in an edition of the Species List until more sufficient documentation is provided.

The next topic was the taxonomic database. ITIS has a free downloadable database structure. Cody has been working with it and felt that with some work and modification, it could be used by SCAMIT. Erin is going to meet with her brother who is a web developer to talk about what it would take to develop a web based tool.

Shelly Walther asked if P-codes for the BRI are going to be prioritized for the database. Kelvin said yes and feels it would add value and may even help secure funding. Some members worried it could open SCAMIT to litigation but not eveyrone agreed with that concern.

That brought up the question of whether we should expand the List to include all species in Southern California in general, which would affect our ability to use p-codes. Shelly noted that p-codes aren't necessarily the issue, but that litigation may be more involved with the BRI. Don stated that the problem historically has been with p-code updates as there is no standardization in application of updates. A long discussion ensued about BRI, SQO's, p-code drift, etc.

Kelvin noted that nothing can proceed without a database. Shelly thinks we need to prioritize our wish list for the database, and that list needs to prioritize p-codes. An initial SCAMIT database was created by Shelly Moore at SCCWRP but support for the project was terminated and it stalled. Shelly Walther suggested starting with an Access database and leave the web-based database for a future wish list.

Brent asked if bay and estuary p-codes were removed (and accordingly SQO responsibilities) to avoid liability and we solely focus on coastal BRI, how much interest will the state water board still have? Shelly feels we should start with coastal BRI and she will reach out to her contacts at the Region 9 Board to see if they are worried about liability issues.

Cody chimed in and agrees with Shelly, that we should start small and not over complicate it. We have access to the database that SCCWRP started and it's hosted on the SCAMIT domain, but, it's hard to work backwards and he feels it would be better to start fresh. SCCWRP's design is going to be substantially different from the ITIS design.

Treasurer, Erin Oderlin

Treasurer's Report: This is our 40th year! Go SCAMIT! Erin reviewed her summary report, noting

that the majority of our members renew via PayPal. We have created a donate button via PayPal and it has been added to the website. She cautioned - just be sure you don't use the donate button for paying your membership dues.

Secretary, Megan Lilly

Megan didn't have many updates other than the fact that she is trying to catch up on newsletters but as usual she is woefully behind. She noted that during the Round Table portion of the meeting members should discuss the option of the newsletter going fully digital.

With that we circled back to Brent and the meeting agenda. We proceeded to fill the 2023 meeting calendar.

It was decided to have a B'23 trawl prep meeting in April. Megan will lead the meeting and will be sure to include counting conventions for species like *Thesea* and conventions regarding what is countable and what is not, i.e., parasites (*Elthusa*), and pelagics (*Doryteuthis*). She will also reveiw aliquoting conventions for *Brisaster* spp, *Pleuroncodes*, etc. She asked people to email her with any other topics they'd like to see included.

At that time nominations for officers was announced and the exisiting suite was nominated. No surprises. There was a prelimnary discussion for adding a secondary Secretary position. Nothing was decided but it is an idea that will be explored further.

Cody, SCAMIT web master, has added a "Latest Website Updates" link to the SCAMIT home page. It lists new additions, such as new species added to the Toolbox and the PayPal donate button.

With that it was time for the Round Table Discussion:

1) Brent – he has received some suggestions to promote SCAMIT meetings on social media. Is this a good idea? Bad idea? If approved, would need to include the meeting Zoom links in the social media post. Erin doesn't see the need to advertise. Brent's concern is that one of the benefits of being a paying member of SCAMIT is the meetings and if we open up attendance to any and all, then people have no reason to join. One suggestion was for SCAMIT to have a social media presence that would simply promote SCAMIT, not necessarily advertise meetings. But then the question arises - who would run it? An action item was created: put out a request on the Listserver for a social media person.

2) Leslie was unable to attend but had given Brent a list of her talking points:

- The Scamit List is limited to species reported by members from member agencies; should we expand the List? Make it more of a faunal list, including all species reported from reputable sources. This wouldn't be done by Ed 14, and would be a longer term project that would take place over a few editions.
- We should not be ignoring validly described species just because they they aren't on the List
- People are already using our list instead of WoRMS, so it is better to expand it
- Could use different colored fonts to indicate what is possible to see versus what has actually been reported
- This would add all the names coming out of Fish and Game invasive species studies, so it would be quite an expansion

Don stated that he is not against this idea but it changes the nature of the List and will require a lot more work to maintain it since we don't currently use the literature to create our list but rather use occurrence data. Addtionally, how do we define "reputable source"?

Shelly seconded Don's concern. She feels the List should be about standardization across the member agencies. She also would like us to focus on the database rather than trying to expand the List. She suggested an Appendix for listing species that are possible to encounter but haven't necessarily been vetted by SCAMIT.

We decided that at least for this year and this edition we will not pursue the option of expanding the List.

Shelly told us that she worked with one of Dr. Sue Kidwell's students on a paper regarding a molluscan BRI and she will share the link.

The meeting was adjourned at 12:25 pm.

SCAMIT TREASURY SUMMARY

Attached you will find the Treasury Summary for the SCAMIT fiscal year 1 June 2021 - 31 May 2022. Technically this should have been included with newsletter, Volume 41 no 1-2, but your Secretary was negligent.

VOUCHER SHEET

Attached you will find a voucher sheet for *Anotomastus gordiodes* (Moore, 1909), prepared by B. Haggin.

LITERATURE CITED

Banse, K. 1981. On Some Cossuridae and Maldanidae (Polychaeta) from Washington and British Columbia. *Canadian Journal of Fisheries and Aquatic Sciences* 38(6): 633-637.

Barwick, K. 2014. *Typosyllis* sp OC1 Voucher Sheet. *SCAMIT Handout.*

Blake, J. A. 1996. Family Chaetopteridae Malmgren, 1867. Pages 233-252. IN: Blake, James A.; Hilbig, Brigitte; and Scott, Paul H. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. Volume 6- The Annelida Part 3. Polychaeta: Orbiniidae to Cossuridae*. Santa Barbara Museum of Natural History. Santa Barbara.

Blake, J. A. 1996. Family Cirratulidae Ryckholdt, 1851. Pages 263-384. IN: Blake, James A.; Hilbig, Brigitte; and Scott, Paul H. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. Volume 6- The Annelida Part 3. Polychaeta: Orbiniidae to Cossuridae*. Santa Barbara Museum of Natural History. Santa Barbara.

Blake, J. A. 1996. Family Spionidae Grube, 1850. Pages 81-223. IN: Blake, James A.; Hilbig, Brigitte; and Scott, Paul H. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. Volume 6- The Annelida Part 3. Polychaeta: Orbiniidae to Cossuridae*. Santa Barbara Museum of Natural History. Santa Barbara.

Blake, J. A. 2015. New Species of *Chaetozone* and *Tharyx* (Polychaeta: Cirratulidae) from the Alaskan and Canadian Arctic and the Northeastern Pacific, including a description of the lectotype of *Chaetozone setosa* Malmgren from Spitsbergen in the Norwegian Arctic. *Zootaxa* 3919(3): 501-552.

Blake, J. A. 2018. Bitentaculate Cirratulidae (Annelida, Polychaeta) collected chiefly during cruises of the R/V *Anton Bruun*, USNS *Eltanin*, USCG *Glacier*, R/V *Hero*, RVIB *Nathaniel B. Palmer*, and R/V *Polarstern* from the Southern Ocean, Antarctica, and off Western South America. *Zootaxa* 4537(1): 1-130.

Blake, J. A. 2019. New species of Cirratulidae (Annelida, Polychaeta) from abyssal depths of the Clarion-Clipperton Fracture Zone, North Equatorial Pacific Ocean. *Zootaxa* 4629(2): 151-187.

Blake, J. A. 2022. New species and records of *Caulleriella*, *Chaetocirratulus* and *Chaetozone* (Annelida, Cirratulidae) from continental shelf and slope depths of the Western North Atlantic Ocean. *Zootaxa* 5113(1): 1-89.

Blake, J. A. & Walton, C. P. 1977. New species and records of Polychaeta from the Gulf of the Farallones, California. *Pages* 307-321. IN: Reish, Donald J. and Fauchald, Kristian. *Essays on Polychaetous Annelids in Memory of Dr. Olga Hartman*. The Allan Hancock Foundation, University of Southern California, Los Angeles.

Blake, J. 2016. *Kirkegaardia* (Polychaeta, Cirratulidae), new name for *Monticellina* Laubier, preoccupied in the Rhabdocoela, together with new records and descriptions of eight previously known and sixteen new species from the Atlantic, Pacific, and Southern Oceans. *Zootaxa* 4166(1): 1-93.

Blake, J. 2019. New species of Cirratulidae (Annelida, Polychaeta) from abyssal depths of the Clarion-Clipperton Fracture Zone, North Equatorial Pacific Ocean. *Zootaxa* 4629(2): 151-187.

Berkeley, E. 1927. Polychaetous annelids from the Nanaimo district. Part 3. Leodicidae to Spionidae. *Contributions to Canadian Biology and Fisheries* 3(17): 407-422.

Berkeley, E. & Berkeley, C. 1942. North Pacific Polychaeta, chiefly from the west coast of Vancouver Island, Alaska, and the Bering Sea. *Canadian Journal of Research, Ottawa 20:* 183-208.

Capa, M., Giangrande, A., Nogueira, J. M. de M. & Tovar-Hernández, M. A. 2014. Annelida: Polychaetes – Sabellidae Latreille, 1825. Pages 1-42. IN: Westheide, Wilfried and Purschke, Gunter. *Handbook of Zoology – A Natural History of the Phyla of the Animal Kingdom*. Handbook of Zoology Online, De Gruyter, Berlin, Germany.

Day, J. H. 1961. The Polychaet [sic] Fauna of South Africa. Part 6. Sedentary species dredged off Cape coasts with a few new records from the shore. *Journal of the Linnean Society of London.* 44(299): 463-560.

De Assis, J. E., de Brito, R. J., Christoffersen, M. L. & de Souze, J. R. B. 2015. A catalogue of the scaleworm genus *Lepidonotus* (Polynoidae, Polychaeta) from South America, with two new records for Brazilian waters. *ZooKeys* 533: 63-98.

Dean, H. K. & Blake, J. A. 2009. *Monticellina* (Polychaeta: Cirratulidae) from the Pacific coast of Costa Rica with descriptions of six new species. *Zoosymposia* 2: 105-126.

Delgado-Blas, V. H. 2014. Redescriptions and reestablishments of some species belonging to the genus *Prionospio* (Polychaeta, Spionidae) and descriptions of three new species. *Helgoland Marine Research* 68(1): 113-132.

Dorsey, J. H. & Phillips, C. A. 1987. A New Species of *Syllis* (*Ehlersia*) (Polychaeta: Syllidae) from Southern California, and Description of the Epitoke and Atoke Variation in *S.* (*Ehlersia*) *heterochaeta* Moore, 1909. *Bulletin of the Biological Society of Washington* 7:152-161.

Elias, R., Rivero, M. S. & Orensanz, J. M. L. 2016. New Species of *Monticellina* and *Chaetozone* (Polychaeta: Cirratulidae) in the SW Atlantic, and a review of Monticellina species. *Journal of the Marine Biological Association of the United Kingdom*. 97(7): 1553-1563.

Fauchald, K. 1972. Benthic Polychaetous Annelids from Deep Water Off Western Mexico and Adjacent Areas in the Eastern Pacific Ocean. *Allan Hancock Monographs in Marine Biology* 7: 1-575.

Fauchald, K. 1977. The polychaete worms, definitions and keys to the orders, families and genera. *Natural History Museum of Los Angeles County: Los Angeles, CA (USA), Science Series.* 28:1-188.

Fauchald, K. & Hancock, D. R. 1983. Deep-Water Polychaetes from a Transect off Central Oregon. *Allan Hancock Foundation Monograph* 11: 1-73.

Fauvel, P. 1928. Annélides polychètes nouvelles du Maroc. *Bulletin de la Société Zoologique de France.* 53(1): 9-13.

Foster, N. M. 1971. Spionidae (Polychaeta) of the Gulf of Mexico and the Caribbean Sea. *Studies on the Fauna of Curaçao and other Caribbean Islands 36:* 1-183.

Gopal, A., Parameswaran, U. V., Abdul Jaleel, K. U. & Saravanane, N. 2020. *Prionospio atrovitta* (Annelida: Spionidae), a new species from Andaman and Nicobar archipelago, northern Indian Ocean. *Marine Biology Research* 16(2): 134-140.

Hamilton, S. 1976. SCCWRP Taxonomic Standardization Handouts.

Harris, L. 2017. NEP Phyllochaetopterus Character Table. *SCAMIT Handout.*

Hartman, O. 1947. Polychaetous Annelids. Part VII. Capitellidae. *Allan Hancock Pacific Expeditions* 10(4): 391-481.

Hartman, O. 1951. The littoral marine annelids of the Gulf of Mexico. *Publications of the Institute of Marine Science, Port Aransas, Texas.* 2(1): 7-124

Hartman, O. 1960. Systematic Account of some Marine Invertebrate Animals from the Deep Basins off Southern California. *Allan Hancock Pacific Expeditions* 22(2): 69-215.

Hartman, O. 1961. Polychaetous Annelids from California. *Allan Hancock Pacific Expeditions* 25:1-224.

Hartman, O. 1963. Submarine canyons of southern California. Part III. Systematics: Polychaetes. *Allan Hancock Pacific Expeditions* 27(3): 1-93.

Hartman, O. 1969. *Atlas of the sedentariate polychaetous annelids from California.* 1-812. Allan Hancock Foundation, University of Southern California. Los Angeles.

Hilbig, B. 1996. Family Cossuridae Day, 1963. Pages 385-404. IN: Blake, James A.; Hilbig, Brigitte; and Scott, Paul H. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. Volume 6- The Annelida Part 3. Polychaeta: Orbiniidae to Cossuridae.* Santa Barbara Museum of Natural History. Santa Barbara.

Hilbig, B. 2000. Family Ampharetidae Malmgren, 1867. pages 169-230. IN: Blake, J. A., Hilbig, B. & Valentich-Scott, P. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and the Western Santa Barbara Channel. 7 - The Annelida Part 4. Polychaeta: Flabelligeridae to Sternaspidae.* Santa Barbara Museum of Natural History. Santa Barbara.

Imajima, M. 1997. Polychaetous Annelids from Sagami Bay and Sagami Sea Collected by the Emporer Showa of Japan and Deposited at the Showa Memorial Institute, National Science Museum, Tokyo. Families Polynoidae and Acoetidae. *National Science Museum Monographs* 13: 1-131.

Imajima, M. & Hartman, O. 1964. The Polychaetous Annelids of Japan. Part I. *Occasional Papers of the Allan Hancock Foundation* 26(1): 1-237.

Jirkov, I. A. 2001. [*Polychaeta of the Arctic Ocean*] (In Russian) *Polikhety severnogo Ledovitogo Okeana.* Yanus-K Press, Moscow, 632 pp.

Jirkov, I. A. 2018. Redescription of Ampharetidae (Polychaeta) described by Nikita V. Kucheruk with the description of a new *Amphicteis* species from the North Pacific. *Invertebrate Zoology* 15(4): 348-365.

Keppel, E., Ruiz, G. M. & Tovar-Hernández, M. A. 2020. Re-description of *Parasabella fullo* (Grube, 1878) (Polychaeta: Sabellidae) and diagnostic characteristics for detection in California. *The European Zoological Journal* 87(1): 105-115.

Kudenov, J. D. and Harris, L. H. 1995. Family Syllidae Grube, 1850. pages 1-97. IN: Blake, James A.; Hilbig, Brigitte; and Scott, Paul H. *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. 5 - The Annelida Part 2. Polychaeta: Phyllodocida (Syllidae and scale-bearing families), Amphinomida, and Eunicida*. Santa Barbara Museum of Natural History. Santa Barbara.

Maciolek, N. J. 1985. A revision of the genus *Prionospio* Malmgren, with special emphasis on species from the Atlantic Ocean, and new records of species belonging to the genera *Apoprionospio* Foster and *Paraprionospio* Caullery (Polychaeta, Annelida, Spionidae). *Zoological Journal of the Linnean Society, London* 84: 325-383.

Magalhães, W. F. & Blake, J. A. 2020. 7.6.4 Capitellidae Grube, 1862. pp. 349–403, *In*: Purschke, G., Böggemann, M. & Westheide, W. (Eds.), *Handbook of Zoology. Annelida*, 2 (Pleistoannelida, Sedentaria II), pp. 1–465.

Molina-Acevedo, I. C. 2018. Morphological revision of the Subgroup 1 Fauchald, 1970 of *Marphysa* de Quatrefages, 1865 (Eunicidae: Polychaeta). *Zootaxa* 4480(1): 1-125.

Moore, J. P. 1904. New Polychaeta from California. *Proceedings of the Academy of Natural Sciences of Philadelphia* 56: 484-503, plates XXXVII-XXXVIII.

Moore, J. P. 1906. Additional new species of Polychaeta from the North Pacific. *Proceedings of the Academy of Natural Sciences of Philadelphia* 58: 217-260 plates X-XII.

Moore, J. P. 1907. Descriptions of new species of spioniform annelids. *Proceedings of the Academy of Natural Sciences of Philadelphia* 59: 195-207.

Moore, J. P. 1908. Some polychaetous annelids of the northern Pacific coast of North America. *Proceedings of the Academy of Natural Sciences of Philadelphia* 60: 321-364.

Moore, J. P. 1909. Polychaetous annelids from Monterey Bay and San Diego, California. *Proceedings of the Academy of Natural Sciences of Philadelphia* 61: 235-295, plates VII-IX.

Moore, J. P. 1909. The polychaetous annelids dredged by the U.S.S. "Albatross" off the coast of southern California in 1904. I. Syllidae, Sphaerodoridae, Hesionidae and Phyllodocidae. *Proceedings of the Academy of Natural Sciences of Philadelphia* 61: 321-351, plates XV-XVI.

Nishi, E. & Rouse, G. W. 2007. A new species of *Phyllochaetopterus* (Chaetopteridae: Annelida) from near hydrothermal vents in the Lau Basin, western Pacific Ocean. *Zootaxa* 1621: 55-64.

Nishi, E. & Rouse, G. W. 2014. First whale fall chaetopterid; a gigantic new species of *Phyllochaetopterus* (Chaetopteridae: Annelida) from the deep sea off California. *Proceedings of the Biological Society of Washington* 126(4): 287-298.

Parker, T. 1995. Update for local Eumida species. SCAMIT Newsletter 14(1): 11-12, 25-35.

Pettibone, M. H. 1963. Marine Polychaete Worms of the New England Region. 1. Families Aphroditidae Through Trochochaetidae. *Bulletin of the United States National Museum* 227(1): 1-356.

Phillips, T. 2004. *Aphelochaeta* sp HYP5 voucher sheet. *SCAMIT handout*.

Reish, D. J. 1959. New species of Spionidae (Annelida, Polychaeta) from southern California. *Bulletin of the Southern California Academy of Sciences* 58(1): 11-16.

Reish, D. J. 1968. A Biological Survey of Bahia de los Angeles, Gulf of California, Mexico. II. Benthic Polychaetous Annelids. *Transactions of the San Diego Society of Natural History* 15(7): 67-106.

Rodriguez-Villanueva, V. 2017. Cirratulidae Ryckholdt, 1851. June 2017 SCAMIT powerpoint presentation.

Rowe, R. C. 1995. *Cossura* species of Pt. Loma. *SCAMIT Handout*.

Ruff, R. E. 1995. Family Polynoidae Malmgren, 1867. 105-166. IN: Blake, James A., Hilbig, Brigitte, and Scott, Paul H. (Ed.). *Taxonomic Atlas of the Benthic Fauna of the Santa Maria Basin and Western Santa Barbara Channel. Volume 5 - The Annelida Part 2. Polychaeta: Phyllodocida (Syllidae and scale-bearing families), Amphinomida, and Eunicida*. Santa Barbara Museum of Natural History. Santa Barbara.

San Martín, G. & Worsfold, T. M. 2015. Guide and keys for the identification of Syllidae (Annelida, Phyllodocida) from the British Isles (reported and expected species). *ZooKeys* 488:1-29.

SCAMIT. 1992. Notes from SCAMIT Workshop, 6/8/92, on the Chaetopteridae and Onuphidae Common Along the Southern California Shelf. *SCAMIT Newsletter* 11(2): 8.

SCAMIT. 2022. B'18 Problematic Polychaetes (12 April 2021). *SCAMIT Newsletter* 39(6): 5.

Treadwell, A. L. 1906. Polychaetous annelids of the Hawaiian Islands collected by the steamer Albatross in 1902. *Bulletin of the United States Fish Commission* 23(3): 1145-1181.

Treadwell, A. L. 1914. New Syllidae from San Francisco Bay, collected by the U.S.S. "Albatross". *University of California Publications in Zoology* 13(9):235-238.

Williams, S. 1985. *Anotomastus gordiodes* voucher sheet. *SCAMIT Newsletter* 3(11): 18.

Zhadan, A. E., Vortsepneva, E. V. & Tzetlin, A. B. 2012. Redescription and biology of *Cossura pygodactylata* Jones, 1956 (Polychaeta: Cossuridae) in the White Sea. *Invertebrate Zoology* 9(2): 115-125.

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Please visit the SCAMIT Website at: www.scamit.org

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SCAMIT Treasury Summary
2021-2022

Below is the treasurer's report for 2021-2022. In 2018 we raised dues for the first time since the start of SCAMIT in 1982 from $15 to $20 for electronic memberships, $30 to $35 for hardcopy memberships, and $60 to $65 for institutional memberships. We have over 150 members across the US and worldwide. As stipulated in our grant policy, we have **$8,022.57** or 25% of our operating budget of $32,090.26 available for publication grants this year. Please help get the word out that these funds are available. The taxonomic database support tools on our website were maintained by our webmasters.

Account Balances (as of 5/31/2022)

Checking	$ 31,364.66
PayPal	$ 725.60
Total	**$ 32,090.26**

Income

2021-2022 Membership dues	**$ 2,996.34**

Expenses

Newsletters (printing/postage)	$ 264.29
January 4, 2021 PayPal Transfer Fee	$ 17.00
Zoom Subscription	$ 187.98
2021-2022 PO Box Renewal	$ 216.00
Total	**$ 685.27**

LOS ANGELES COUNTY SANITATION DISTRICTS
Converting Waste Into Resources

Voucher Sheet
B. Haggin
September, 2022

Species: *Anotomastus gordiodes* (Moore, 1909)
Synonyms: *Eunotomastus gordiodes* Moore, 1909

P-Code—P057
ITI—no group assignment

Subfamily:
Family: Capitellidae
Suborder:
Order:
Infraclass: Scolecida
Subclass: Sedentaria
Class: Polychaeta
Phylum: Annelida

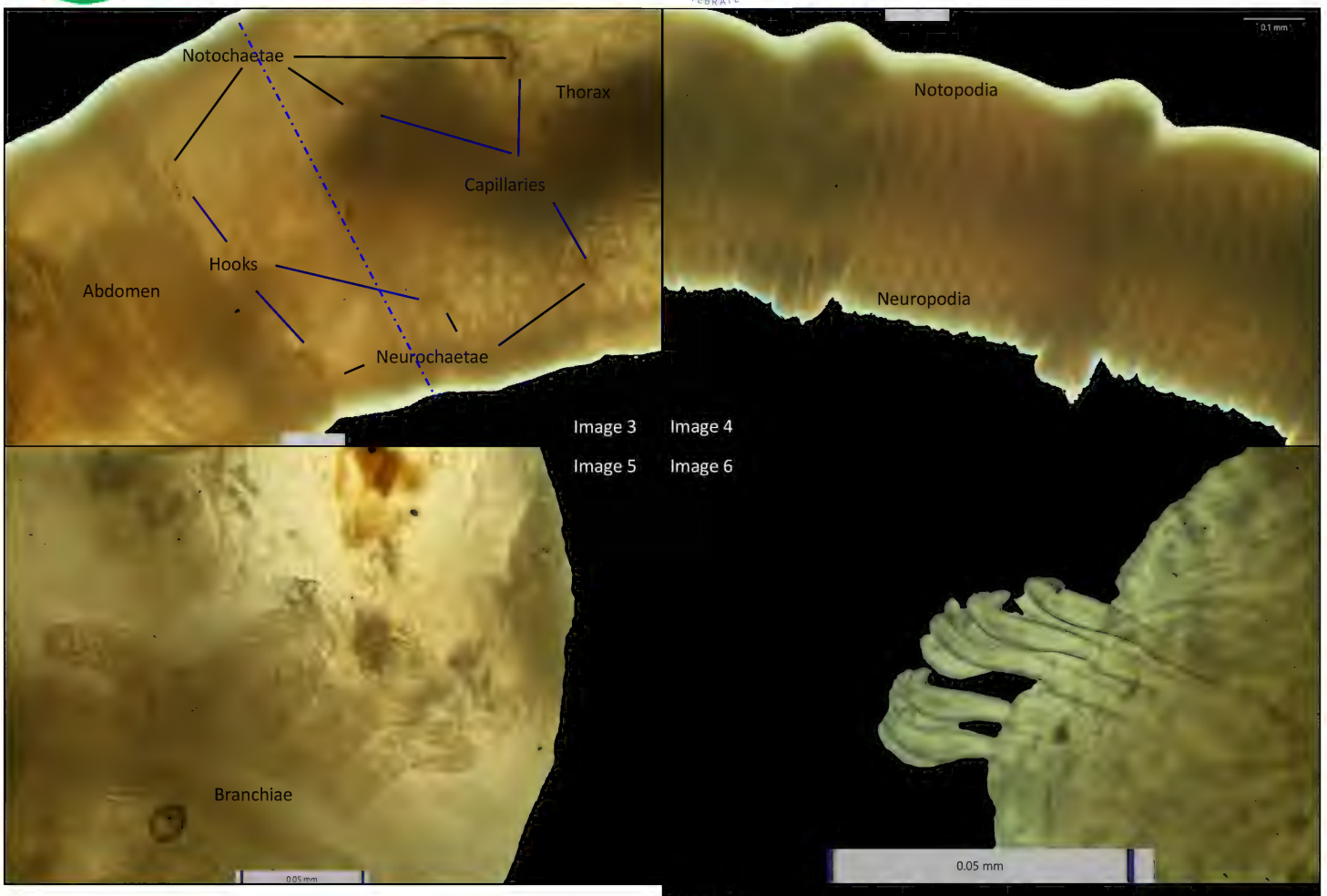
Photos by B. Haggin

Diagnostic Characters: (from Moore, 1909; Hartman, 1947; Hartman, 1969)

1) Prostomium elongate, rounded anteriorly (appearing as a small palpode) bearing a pair of nuchal organs; 6-15 reddish-brown eyespots (may be faded) **(Images 1 & 2)**
2) Peristomium truncate, subconical, smooth; slightly longer than chaetiger 1, somewhat constricted around the middle; with a pair of small spots, probably representing the lateral organs; lateral groove present **(Image 2)**
3) Thorax with achaetous segment absent; chaetiger 1 incomplete, with notochaetae only **(Image 2)**
4) Thoracic formula— $^{(17\text{-}18c)}/_{(0+15\text{-}16c+1m)}$ **(Image 3)**
5) Abdominal neuropodia forming distinct ventro-lateral tori, somewhat elevated and glandular **(Image 4)**
6) Branchiae present in posterior abdominal segments; dorsal, posterior to notopodia; tufted/palmate, with up to 12 filaments **(Image 5)**. Notochaetae reduced in number with branchial insertion, becoming lost entirely in far posterior segments.
7) Abdominal hooded hooks with a distinct shoulder, a neck that gradually increases in diameter to a rather large head with a stout beak and high crest enclosed in a short but much inflated hood; main fang surmounted by a single large tooth and a crest of 5 teeth in three rows (1*2*2) **(Image 6)**
8) Lateral organs located along thorax between noto- & neuropodia
9) Nephridial pores present in posterior thorax in intersegmental furrows
10) Pygidium with a pair of thicker, longer filaments ventrally and 4-5 slenderer, shorter filaments on the sides **(Image 7**, showing regeneration**)**

Pigmentation/MGS:

1) Prostomium, peristomium and chaetiger 1 with lightly speckled stain **(Images 8 - 11)**
2) Chaetigers 2-15(16) staining intensely **(Images 8 - 13)**
3) Last thoracic and first abdominal chaetigers with stain lightening **(Images 8 - 11, & 13)**
4) Abdominal stain with thin band around tori, connecting ventrally but not dorsally; stain fades and stops around branchial insertion **(Images 8 - 11)**
5) Images 11-13 show detail of the variability of stain in the posterior thorax, including the "honeycomb" pattern **(Image 12)** reported by CLAEMD



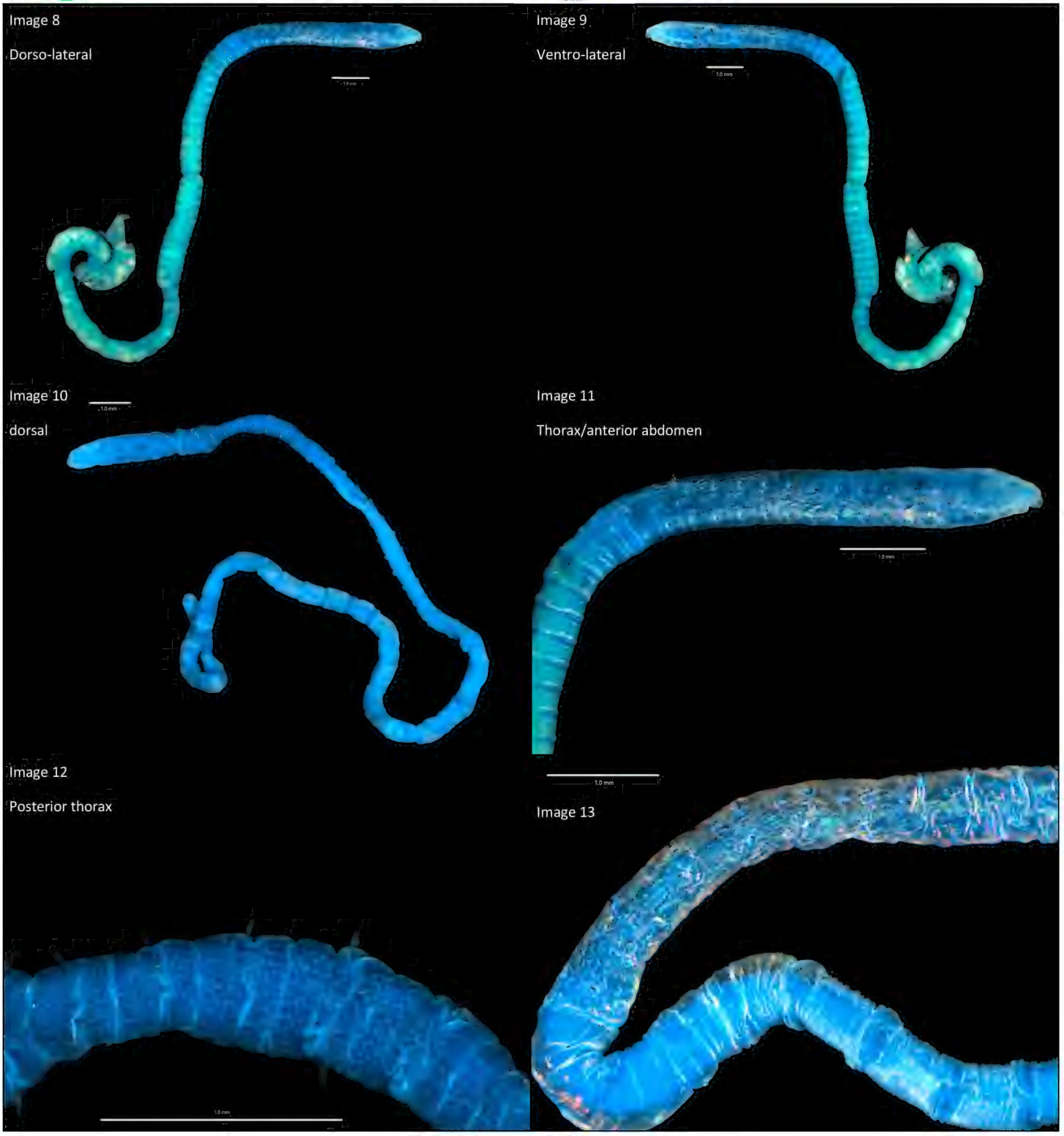
Material Examined:

LACSD station 0194-1D (31 m—33.76500N, 118.43530W—12JAN94) - 1 individual (Images 1, 2, 3, 5, 6, 8, 9 & 11)

SCBPP station PLABE 11230 (15 m—33.87095N, 118.41870W—19JUL94) - 1 individual (Images 4, 10 & 12)

SCBPP station PSCBE 06650 (24 m—34.20236N, 119.34052W—16AUG94) - 2 individuals (Images 7 & 13)

Photos by B. Haggin



Photos by B. Haggin

Similar Species:

With 17-18 thoracic chaetigers, *Anotomastus gordiodes* (Moore, 1909) should not be confused with any other local capitellid species, the next closest being *Dasybranchus glabrus* Moore, 1909 with 13 thoracic chaetigers.

Globally, the genus *Anotomastus* could be confused with the genus *Pseudocapitella* (17 thoracic chaetigers; $^{(17c)}/_{(0+13c+3h)}$) (sensu Magalhães & Blake, 2020), the genera *Capitobranchus* (sensu Fauchald, 1977) or *Paracapitella* (sensu Magalhães & Blake, 2020) (both with 18 thoracic chaetigers; $^{(18c)}/_{(14c+4h)}$ & $^{(18C)}/_{(0+9C+8H)} + {}^{(4c)}/_{(4h)}$ respectively) , or the genera *Eunotomastus* (sensu Magalhães & Blake, 2020) or *Lumbricomastus* (sensu Magalhães & Blake, 2020) (both with 20 thoracic chaetigers; $^{(16c+4m)}/_{(16c+4h)}$ & $^{(20c)}/_{(0+19c)}$ respectively). The larger chaetiger counts of the genera *Eunotomastus* or *Lumbricomastus* should distinguish them from the genus *Anotomastus* and all can be differentiated by their thoracic formulas.

Habitat:

Anotomastus gordiodes has been reported in the literature to inhabit mud flats in low, intertidal zones (Hartman, 1947). *Anotomastus* was described from the intertidal in San Diego (Moore, 1909). Hartman (1947) extended the range north to the Anaheim Slough, with questionable records from Bodega Bay in central California, with a depth of intertidal. Hartman (1963) extended the range north to Oxnard, California and extended the depth to 119 m. Reish (1968) extended the range of A. gordiodes south to Bahía de los Ángeles, Baja California, Mexico, Gulf of California. Hartman (1969) lists the distribution from southern to central California, in intertidal and shelf depths.

Anotomastus gordiodes has been reported from Santa Monica Bay and LA Harbor in 11-17 m by CLAEMD, from Palos Verdes Peninsula in 15-30 m by LACSD, and from San Diego in 13-37.5 m by CSD. OCSD's only record is off Huntington Beach during B'18 (see below). It has been collected from Huntington Beach to Ventura and Santa Cruz Island during Bight surveys.

Discussion:

Anotomastus is a monotypic genus erected by Hartman in 1947 to accommodate the species *Eunotomastus gordiodes* Moore, 1909 because it differed from the type species *Eunotomastus grubei* McIntosh, 1885 in the number of transitional thoracic chaetigers (1 in *Anotomastus* and 4 in *Eunotomastus*). Transitional thoracic chaetigers are defined as those with capillary notochaetae and hooded hooks or mixed fascicles in the neuropodia. *Eunotomastus* also has a complete first chaetiger whereas *Anotomastus* has an incomplete first chaetiger. The number of transitional thoracic chaetigers can also be used to help distinguish between *Pseudocapitella*, *Paracapitella* and *Anotomastus* as they all have different number of transitional thoracic chaetigers.

The genus *Anotomastus* is described as having 17-18 thoracic chaetigers but a review of LACSD material shows worms with as few as 15 thoracic chaetigers and no transitional thoracic chaetigers (possibly juveniles). A review of *A. gordiodes* from San Diego Bay by Leslie Harris (pers. comm.) also shows variation in the chaetal arrangement of the posterior thorax, with hooded hooks present from the 17th chaetiger, rather than the 18th, hooks in the last thoracic notopodia, capillary chaetae only or capillary chaetae present in the first abdominal notopodia.

Variation in the MGS pattern can also be seen within *A. gordiodes*. The thoracic stain is fairly consistent as far as which chaetigers stain intensely, but whether the stain is solid or speckled in the posterior thorax seems to be variable. The degree of abdominal banding is also highly variable, being either absent completely (B'13-9304—L. Harris, pers. comm., 21m off Santa Cruz Island, CA; B'18-10226—K. Barwick, pers. comm., 29m off Huntington Beach, CA) to present, and ranging from faint to intense in LACSD samples **(Images 8-11 & 13)**.

The type locality of *Anotomastus gordiodes* is San Diego, intertidal. Leslie Harris has suggested that true *A. gordiodes* only occurs in shallow water and we perhaps have an additional species subtidally. An additional review of *A. gordiodes* specimens from throughout the SCB would be needed to assess this.

References:

1) **Fauchald, K.** 1977. The polychaete worms, definitions and keys to the orders, families and genera. *Natural History Museum of Los Angeles County: Los Angeles, CA (USA), Science Series* 28: 1-188.

2) **Hartman, O.** 1947. Polychaetous Annelids. Part VII. Capitellidae. *Allan Hancock Pacific Expeditions* 10(4): 391-481.

3) **Hartman, O.** 1963. Submarine canyons of southern California. Part III. Systematics: Polychaetes. *Allan Hancock Pacific Expeditions* 27(3): 1-93.

4) **Hartman, O.** 1969. *Atlas of the sedentariate polychaetous annelids from California*. 1-812. Allan Hancock Foundation, University of Southern California. Los Angeles.

5) **Magalhães, W. F. & Blake, J. A.** 2020. 7.6.4 Capitellidae Grube, 1862. pp. 349–403, *In*: Purschke, G., Böggemann, M. & Westheide, W. (Eds.), *Handbook of Zoology*. *Annelida*, 2 (Pleistoannelida, Sedentaria II), pp. 1–465.

6) **Moore, J. P.** 1909. Polychaetous annelids from Monterey Bay and San Diego, California. *Proceedings of the Academy of Natural Sciences of Philadelphia* 61: 235-295, plates VII-IX.

7) **Reish, D. J.** 1968. A Biological Survey of Bahia de los Angeles, Gulf of California, Mexico. II. Benthic Polychaetous Annelids. *Transactions of the San Diego Society of Natural History* 15(7): 67-106.

8) **Williams, S.** 1985. *Anotomastus gordiodes* voucher sheet. *SCAMIT Newsletter* 3(11): 18.

Version History:

Version 1.0—Voucher sheet created (06SEP2022)

SOUTHERN CALIFORNIA ASSOCIATION OF MARINE INVERTEBRATE TAXONOMISTS

January–April 2023 SCAMIT Newsletter Vol. 41 No. 5&6

Dr. Eric Hochberg at the Santa Barbara Museum of Natural History studying what else...a cephalopod!

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The SCAMIT newsletter is not deemed to be a valid publication for formal taxonomic purposes

Publication Date: March 2024

09 JANUARY 2023, BIVALVIA PART IV, LEAD T. PHILLIPS, ZOOM

Attendees: Brent Haggin, Don Cadien, Jojo Loan, Terra Petry, Wayne Dossett, LACSD; Andrew Davenport, Wendy Enright, Lauren Valentino, Coulson Lantz, CSD; Mariah Scott University of Chicago; Paul V Scott, SBMNH Retired; Tony Phillips, DCE; Alison Fisher, Jessica Donald, Ashley Loveland, SFPUC; Ben Ferraro OCSD; Carol Paquette, MBC; Greg Lyon, CLAEMD; Kelvin Barwick, DCE; Austin Hendy, NHMLAC.

UPCOMING MEETINGS

Visit the SCAMIT website at: www.scamit.org for the most current meetings announcements.

For the business portion of the meeting Brent announced that anyone who is interested in running for a SCAMIT officer position still has time to put their name in the hat.

A reminder that the SCUM (Southern California Unified Malacologists) meeting will be held 4 February 2023 at the City of San Diego lab starting at 9 a.m. Tony asked about the CSD lab's COVID protocols and was told they have loosened somewhat, and masks will not be mandatory. It was noted that several agencies are easing in-person restrictions. SCAMIT will still try to maintain a hybrid option for meetings going forward.

Tony started his presentation by thanking collaborators, especially Paul V Scott, and the POTW agencies, for sharing their specimen vouchers. He also shared another series of volumes he's been using to look at juvenile-adult form differences in various species.

Although originally his presentation focused on the order Venerida, with recent taxonomic changes, it now encompasses 4 different orders containing 14 families.

Order Galeommatida

He highlighted Paul's recently described *Cymatioa cookae* (Willett, 1937) and showed similarities and differences with *Cymatioa electilis* (Berry 1963) and *Kurtiella coani* (Scott 1998)

He showed how similar *Cymatioa electilis* and *Rhamphidonta retifera* (Dall 1899) juveniles are (3mm or less). However, when the valves are opened and stained either with crystal violet or shirlastain to increase contrast, the teeth are distinctive.

Waldo arthuri Valentich Scott et al 2013 is almost always found on the heart urchin *Brisaster.*

Order Cardiida

Donax is found VERY shallow, as in the surf zone, and most offshore monitoring agencies won't sample it. There are two species with distinctive outlines.

Gari californica (Conrad 1849) was discussed and then compared and contrasted to *G. fucata* (Hinds 1845) with its distinctive, large external ligament.

Heterodonax pacificus (Conrad 1837) is also a very shallow/bay species with highly variable pigmentation.

Tony shared a comparison of adult-juvenile *Nuttalia nuttallii* (Conrad 1837) which is another shallow water species.

Next in the "nice growth series" category was *Cumingia californica* Conrad 1837. This is a shallow water species. He also also detailed the chondrophore.

There are five species of *Semele* in Southern California; mostly shallow but some may be found sub-tidally.

Theora lubrica Gould 1861 is an invasive species from Japan and is found in bays. It is very fragile making it difficult to see an intact hinge after bleaching the valves open.

Solecurtus guaymasensis (Lowe 1935) is a "lovely critter" and very rare.

Tagelus spp:

- *Tagelus affinis* (C. B. Adams 1852) – the pallial sinus is even with the umbo or just a bit beyond (visible through the exterior in some specimens).
- *Tagelus californianus* (Conrad 1837) the pallial sinus is short of the umbo and it has a heavier yellowish periostracum.
- *Tagelus subteres* (Conrad 1837) is brown/olive with a purplish interior.

Order Venerida

Chama arcana Bernard 1976 will only be sampled in very rocky/cobble areas.

For the Vesicomyidae, taxonomists will probably need to open and examine hinges since all three genera are externally similar.

Diplodonta orbella (Gould 1851) is extremely inflated as an adult, less so as juveniles but the hinge is morphologically consistent. *Diplodonta sericata* (Reeve 1850) may not be a valid ID and Tony will need to take a closer look. The distinction between the two species is in the periostracum with *D. orbella* being dehiscent and *D. sericata* being shiny.

Most shells in the family Veneridae are shallow/bay/intertidal. Tony detailed differences between *Chione*, *Callithaca*, *Leukoma*, *Irusella*, *Globivenus*, and *Chionista*. More distinctive are *Compsomyax* and *Tivela*. However, Tony cautioned the *Nutricola* can also be very tricky.

Tony then reviewed select juveniles of *Leukoma* and *Callithaca*, showing that *Leukoma* has crenulated ventral margins while the ventral margins of *Callithaca* are smooth.

Pitar and *Saxidomus* may be confounded – both have brown/chestnut maculations but the hinges are distinct, even at small sizes.

Venerupis philippinarum (A. Adams & Reeve 1850) is another well-established invasive. It is distinctive and colorful with pronounced sculpturing and extremely variable pigment.

Neoleptonidae

- No pictures to share of *Bernardina bakeri* Dall 1910 yet but Paul offered to share his images.

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- Differences between *Neolepton salmoneum* (Carpenter 1864) and *Neolepton subtrigonum* (Carpenter 1857) come down to overall shape and the presence/absence of the left anterior lateral tooth
- It was noted that Neoleptonids are brooders

Cooperella subdiaphana (Carpenter 1864) is opalescent/pearly. It has a deep pallial sinus and separate siphons. It is found from bay habitats out to the mid-shelf.

Petricola carditoides (Carpenter 1864). Is found to 45m. It is distinct from *Petricola californiensis* Pilsbry & Lowe 1932 in having external divaricate sculpture. *Petricola hertzana* Coan 1997 is more subtrigonal and with a much wider pallial sinus compared *to P. carditoides.*

Order Adapedonta (new for SCAMIT Ed14)

Hiatella arctica (Linnaeus 1767) is a nestler with a highly variable shape. The cardinal teeth are obscure in adults. The juveniles often have spines amongst their sculpturing and often have commarginal folds.

Panomya norvegica (Spengler 1793) has been previously ID'ed by some as *Panopea generosa* Gould 1850. There are differences in the medial sulcus and cardinal teeth. It may occasionally be superficially similar to *Hiatella* but the sulcus of *Panomya* is a distinctive character.

The genus *Saxicavella* is now in the family Basterotiidae. The two species encountered locally can be distinguished by overall shape. Additionally, *Saxicavella nybakkeni* Scott 1994 has a sunken ligament while *Saxicavella pacifica* Dall 1916 has an external ligament.

Solen rostriformis Dunker 1862 is mostly found in bays. It is longer and thinner than *Solen sicarius* Gould 1850. Also, the pallial sinus in *S. rostriformis* extends past the adductor muscle scar while in *S. sicarius* the sinus is shy of the muscle. These two species may co-occur in deeper bays but out on the shelf it should only be *S. sicarius*.

Ensis myrae Berry 1953 may superficially resemble *S. sicarius* at small sizes but *E. myrae* is narrower and concave in curvature in comparison.

Siliqua lucida (Conrad 1837) is currently the only species of *Siliqua* on the west coast that is found south of Point Conception. Differences from the other, northern species, were mentioned and specified in the "blue book" (Coan et al 2000).

With that, Tony concluded his power point. His next bivalve presentation will be in November 2023 and will cover another three groups: the rest of the erstwhile Venerida (Mactridae, Myidae, Corbulidae, Spheniopsidae), plus the orders Pholadida, and Anomalodesmata.

13 FEBRUARY 2023, POLYCHAETE TOOLBOX REVIEW PART 3, K. BARWICK, ZOOM

Attendees: Kelvin Barwick, Tony Phillips DCE; Gregory Lyon, Jennifer Smolenski, Nicholas Galliani, Erin Oderlin, CLAEMD; Ricardo Martinez, Veronica Rodriguez, Maiko Kasuya, Adam Webb, CSD; Leslie Harris, NHMLAC; Chip Barrett, Michael Ruster, EcoAnalysts; Amanda Martinez, CSULB grad; Rob Gamber, Ernie Ruckman, OCSD; Theresa Diaz, MBC; Alison Fisher, SFPUC.

Families addressed during the Toolbox review included: Trochochaetidae, Acrocirridae, and Cirratulidae, Ctenodrilidae, Fauveliopsidae, Flabelligeridae, Ampharetidae, and Pectinariidae. Below are a few notes from the day.

Ricardo offered to look for Rick Rowe's original documents instead of just scanned copies.

Veronica's images of *Aphelochaeta phillipsi* were reviewed.

It was noted that the methyl green staining pattern of *Kirkegaardia cryptica* (Blake 1996) can be variable.

According to Tony, *Kirkegaardia* sp 1 is a synonym of *K. serratiseta.*

MARCH 2023 - canceled

3 APRIL 2023, SLRC, LEAD K. BARWICK, ZOOM

Attendance: Kelvin Barwick, Dean Pasko, Tony Phillips, DCE; Don Cadien, Brent Haggin, LACSD; Megan Lilly, Wendy Enright, Zoë Scott, Veronica Rodriguez, Katie Beauchamp, Ricardo Martinez, Andy Davenport, CSD; Jennifer Smolenski, Greg Lyon, Erin Oderlin, CLAEMD; Leslie Harris, NHMLAC; Ben Ferraro, OCSD; Marie Nydam, SOKA University.

Kelvin started the meeting by reviewing the agenda he had created. The deadlines as they currently stand are in line to be met.

Tony announced the he is stepping down from the cnidaria and platyhelminthes and a volunteer will be needed to take his place. Anyone interested please contact Tony.

Zoë gave an overview of her Tidy crosscheck.R program and how she wrote it to work with WoRMS. This tool is proving to be very useful.

Ongoing Provisional Species Review was discussed next:

- Action items
    - Kelvin will send out his latest spread sheet for review of the pending suggested actions.
    - If someone disagrees with the recommended action for the species they will need to provide a justification
    - If it is decided to remove a provisional it will need to be noted if the species will be moved to the temporary or permanent hold list
    - Check the hold list and see if anything can be moved back to the emend list due to documentation being uploaded since the last review
    - If satisfactory documentation is provided there will be a May 1st deadline for uploading to the toolbox
    - Editors will create an appendix in the front matter to list those species removed

Discussion ensued on including fouling communities/rip rap surveys, etc. It was decided that all are welcome.

Jennifer brought up the subject of the alphabetization of the List. The current format is that the

List is set up phylogenetically primarily and within that, alphabetic. But there are exceptions to that rule. Jen's question was how do we know when it is out of order intentionally or just a mess? Don answered that based on outcoming molecular papers and with those results being incorporated in to levels above genus, it has created some changes and therefore many things are non-alphabetical. These exceptions/changes are not denoted anywhere. Jennifer pointed out that for instance the cnidarians are very out of alpha order. Don stated that if it's a single thing out of order, it's probably accidental but if everything is jumbled it's probably intentional. Another rule regarding the formatting of the List is that synonymies are listed by order of creation. Wendy clarified that rule a bit - provisionals are only alphabetized if they are listed as synonymies. But, when a provisional is as valid described species, it is listed at the bottom of a genus/Family, etc. Don also noted that alphabetic provisionals come before numeric provisionals.

A long discussion followed regarding organization of the List. It was decided to leave it as is for now. Any changes in the future are acceptable but justification for the changes must be documented/cited.

10 APRIL 2023, TRAWL INVERTEBRATE ID REVIEW, ZOOM, LEAD M. LILLY

Attendance: Brent Haggin, Wayne Dossett, Amber Von Tungeln, Don Cadien, LACSD; Megan Lilly, Adam Webb, Maiko Kasuya, Wendy Enright, Lauren Valentino, Andrew Davenport CSD; Erin Oderlin, Greg Lyon, Jennifer Smolenski, Danielle Ayala, JoAnne Linnenbrink, CLAEMD; Ben Ferraro, OCSD; Kelvin Barwick, DCE; Dario Diehl, SCCWRP; John Rudolph, Chris Stransky, Bill Isham, WSP; Jim Mann, ABC; DJ Schuessler, MBC; Michael Mori, Cameron Yong, OCPW; Amanda Martinez, CSULB Wetland Ecology graduate.

The first section covered crustacea. Some name changes were addressed, and key characters were highlighted. In some cases, similar species were shown side by side along with the key characters that distinguish them.

A question was raised regarding *Nymphon* species. Don suggested we may not be accurately distinguishing *Nymphon pixellae* Scott 1913 from *Nymphon heterodenticulatum* Hedgpeth 1941 in the field. *N. pixellae* is much more common but it was suggested that all *Nymphon* specimens be brought back for identification in the lab.

The differences between *Paralithodes californiensis* (Benedict 1895) and *Paralithodes rathbuni* (Benedict 1895) were reviewed. *P. californiensis* has a pair of proportionately larger spines on the posterior carapace and has only a mildly bifurcated rostrum whereas *P. rathbuni* has spines that are mostly subequal along the carapace and has a deeply bifurcate rostrum.

A new key to the galatheid crabs is in the works. The old key is still accurate but does not include *Munida tenella* (now *Iridonida tenella* (Benedict 1902)). Andy is adding a couplet which will include that species and is adding more details regarding spination as well as rostrum morphology. This group is also undergoing a lot of name changes for Ed 14 so Don will be adding the names.

Megan told people to watch out for *Chorilia longipes* Dana 1851 in deeper waters and not to confuse it with *Loxorhynchus* species.

Next up was Echinodermata.

Megan reviewed the two species of *Dendraster* - *Dendraster excentricus* (Eschscholtz 1831)

and *Dendraster terminalis* (Grant & Hertlein 1938) and discussed both their morphological and habitat differences. *D. excentricus* is purple, has a relatively thick test and robust spines and lives in shallow, high energy environments. *D. terminalis* is pale, has fine spines, a relatively thin test, and lives offshore in 20 – 30m of water.

As for the regular urchins, *Centrostephanus coronatus* (Verrill 1867), while not a rare species, is not usually seen in POTW monitoring programs. People should look for it in bays or near Catalina Island. The relatively rare *Arabacia incisa* (A. Agassiz 1863) has also been sampled in the SCB.

Apostichous species possibly encountered include the shallow *Apostichopus parvimensis* (H. L. Clark 1913), the mid-shelf *Apostichopus californicus* (Stimpson 1857,) and in deeper waters (200 m+) *Apostichopus* sp A (SCAMIT 2004 §). Over time there has been some confusion in the field regarding *Apostichopus* sp A. Don speculated that it may actually be *Apostichopus johnsoni* (Théel, 1886) but the original ossicle size measurements were different than those described for *johnsoni*. More ossicle measurements are needed and the mystery continues.

For *Astropecten* depth is not as reliable an indicator as one might hope. As a general rule, *Astropecten armatus* Gray 1840 will be in shallower waters, with CSD sampling it in 10m or less. *Astropecten californicus* Fisher 1906 has a wide range of habitat and CSD has seen it from 20–100m and deeper. *Astropecten ornatissimus* Fisher 1906 is seen by CSD at 200m or deeper (unless there is a cold upwelling event) but LACSD sees them with some regularity as shallow as 80m, so use caution when separating *A. californicus* from *A. ornatissimus*. Field identification is actually better for these two species with *A. ornatissimus* always being a pale to medium orange color and *A. californicus* varying from grey to purple-grey-blue, to red. When in doubt, a count of paxillae rows will separate the two but a microscope is needed for this. There is a key to the *Astropecten* spp in the Taxonomic Toolbox on the SCAMIT website.

Sclerasterias heteropaes are usually in shallow water on cobble/mixed bottoms (LACSD sees them commonly). They have a slight constriction to the arm just before the disc that CLAEMD uses as a quick character.

Stylasterias forreri are more commonly found in association with kelp beds but CSD has found them associated with their thermistor anchor in 100m of water.

Some of the "cookie" stars were reviewed - *Ceramaster* and *Odontaster*. You will need Fisher 1911 to separate the two species of *Ceramaster* – *Ceramaster patagonicus* Sladen 1889 and *Ceramaster leptoceramus* (Fisher 1905) and the difference has to do with the furrow spines. As for *Odontaster* it has a very distinctive, large apical tooth on each jaw, but it can be overlooked as it is translucent and tusk-like and folds back upon itself and points away from the mouth/distally when in this position.

Use caution with separating *Mediaster aequalis* Stimpson 1857 and *Pseudarchaster pusillus* Fisher 1905. They have been confused in the field during previous Bight projects. Megan showed a slide with the two species side by side. Use Fisher 1911 and Ludwig 1905.

Two unusual deep water sea stars seen in previous Bight projects are *Myxoderma platyacanthum* (H. L. Clark 1913) and *Thrissacanthias penicillatus* (Fisher 1905). *M. platyacanthum* is slimy and pale and has large rows of pedicellaria running down the dorsal surface of the arms. *T. penicillatus* is not slimy and has rows of pedicellaria that run transversely across the arms. It

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also has large, obvious arm spines. Both have been sampled ≥ 400m by CSD.

Mollusca were next and Megan gave a quick run through of some the snails and slugs that could possibly be encountered.

There are two similar species within the Philinoidea: *Philine auriformis* Suter 1909 and *Philinorbis albus* (Mattox 1958). Megan reviewed some of the morphological differences that can be used in the field. Sadly, the native species, *P. alba* has become very rare in the last 30 years or so and is very infrequently sampled. The same cannot be said for the introduced species, *P. auriformis*.

Octopus species were discussed, and Megan had to force herself to keep moving since this is her favorite group and she could have waxed philosophic for hours. She briefly reviewed the differences between the "two spot" species, *Octopus bimaculatus* Verrill 1883 and *Octopus bimaculoides* Pickford & McConnaughey 1949. Both habitat differences (*O. bimaculoides* tends to be in bays/quiet water areas and *O. bimaculatus* tends to be in subtidal areas) and ocelli differences were reviewed. The other octopus species that can cause confusion in the field are *Octopus rubscens* Berry 1953 and *Octopus veligero* Berry 1953. Definite caution needs to be used when identifying these two. Watch for differences in maculae (2 prs of dark maculae on *O. veligero* that are not an option in *O. rubescens*), arm to mantle ratio (shorter arms, proportionately, in *O. veligero*), and the "fairy light" display often given by *O. veligero*. Megan showed pictures of all these characters in her presentation. A reminder was given that the distinctive stellate granules in the skin of *Octopus californicus* (Berry 1911) are cartilaginous, and they are not ephemeral.

Cnidaria – sea pens, gorgonians, and octocorals oh my! Counting protocols for these colonial animals were reviewed. With sea pens such as *Acanthoptilum*, you count the bulbs if you get a large haul with fragmented animals. As for the *Thesea*, *Heterogorgia* and *Telesto* - good luck and do your best.

There was a brief discussion regarding *Thesea* - *Thesea* sp A Ljubenkov 1986 § has much larger polyps than *Thesea* sp B and is also bright white and much more robust. It's very rare. Also watch out for *Heterogorgia* which could be confused with *Thesea* if examination is not careful. See Tony Phillip's B'13 cnidaria presentation for photos and descriptions of these animals.

It was noted in Megan's slide on *Eugorgia rubens* Verrill 1868 that there might be more than one species represented. Those present felt that the animal pictured on the left was the true *E. rubens* which is a more delicate animal with fine branches. The thick, robust animal pictured on the right, it was felt, was incorrectly identified. An interesting discussion ensued regarding the best way to identify gorgonians in the field and consensus was reached that most gorgonians should be photographed (from multiple angles) in the field and then a branch should be brought back to the lab for sclerite preps and/or saved for Beth Horvath at Westmont College.

Regarding the deep water anemones: *Urticina columbiana* Verrill 1922, Don noted, has calcareous granules in the column that give it a rough texture and distinguish it from the verrucae of the Hormathiidae anemones. He also pointed out that *Liponema brevicorne* (McMurrich 1893) has deciduous tentacles so if they're treated roughly during sampling you might see them as "bald", but the aboral sucker is still distinctive.

Sponges, Bryozoa, and more. There are some slight differences amongst the agencies in protocols

for these animals but we tried to reach an agreement with regards to approach. CSD tends not to count the bryozoan mats based on expediency. Don stated that many of these mats are akin to drift kelp and are not part of the epibenthic community, thereby providing an actual ecological argument for not counting them.

At the end of the presentation Dario posed a couple of discussion questions. The first dealt with Photo Vouchers:

- What animals are common enough to voucher as a photo?
- Are there photographable features that make it unique?

The response was a consensus that a single photo would likely not be enough to be an acceptable photo voucher. The photos need to clearly show the distinguishing features of the organism in a way that makes it identifiable from the photos. Don followed up with an emphasis on the characters being conclusive and exclusive. A simple overview photo of large animals may not be sufficient. There must be clear photos of the detailed characters. This could, and likely will, require multiple images of a single specimen. If this can not be obtained, then a photo of the organism should be taken and a representative tissue sample taken and placed in 95% EtOH for genetic analysis. Additionally tissue samples of larger organisms (i.e. sponges) should be taken if the animal is too large to bring in from the field. All that being said, photos are encouraged, even when bringing back the entire animals themselves.

The second discussion question dealt with fouling vs infauna vs pelagic organisms and what should be done with them. It was generally agreed to use your best judgement in the field as to whether a species meets the definition of an "epibenthic" organism and if it should be identified and counted. If time allows, it would be best to count and record the organisms and they can be excluded from the analysis later if they are deemed to be fouling or pelagic. Kelvin waxed philosophical about the purpose of trawls and what the data are actually supposed to mean. The end message seemed to be that each agency will continue to do their best and slight differences will be addressed during the post-field data meetings. The same "use your best judgement" was drawn for how to distinguish "fouling" communities. There's a line to be drawn with regards to what's reasonable effort to identify the organisms especially if there is the potential for the species to later be excluded from the data analysis.

The final question was regarding subsampling *Brisaster/Brissopsis* from large hauls for positive identification in the laboratory. It was decided that subsampling 30 individuals for identification worked well in Bight '18 and would be employed again for Bight '23.

Dario also mentioned that Regina at the NHMLAC is interested in collecting more megabenthic invertebrate DNA samples. Modest, humorous discussion of the future of eDNA followed.

Mary Wicksten offered (via email) to help out with any unusual decapods we may come across during our efforts.

The meeting closed out with an adorable series of photos of *Moreiradromia sarraburrei* (Rathbun 1910) wearing its distinctive "sponge hat".

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IN MEMORIAM, DR ERIC HOCHBERG

Dr. F. G. Hochberg, aka "Eric", passed away on May 31st 2023 and this tribute to him is long over-due. Included below are rememberances and contributions from SCAMIT members who knew and cared for him. The world lost a great scientist and an even better human being when Eric passed.

My Octopus Teacher (apologies to Netflix), Megan Lilly

It's taken me awhile to write this memoriam in honor of Dr. Hochberg because I felt his loss deeply and needed time to process. When I was graduating from Humboldt State University (now Cal Poly Humboldt) in the way back times (1991), I was trying to figure out where to go and what to do with my life. I knew that I wanted to pursue marine biology but not much else. I went to my advisor, Dr. Gary Brusca, and asked for guidance. He knew I loved octopus above all else and said, "move to Santa Barbara, go the Santa Barbara Museum of Natural History and ask to meet Dr. Eric Hochberg. Tell him I sent you". And so that is exactly what I did – I moved to Santa Barbara and called the Museum to set up an appointment with Eric. Unfortunately, I came down with a horrible cold the day before my appointment, but I didn't dare cancel and reschedule as this man was my idol. So, I showed up at his office with a fever, snotty nose, cough, runny eyes and looking like death on toast. I was so nervous but determined to make a good first impression. Eric tried not to reel back in horror as I came in sniffling and sneezing, and he politely declined my proffered hand-shake. He listened calmly (only occasionally wincing and recoiling when I coughed or sneezed) as I told him about my love of all things cephalopod and how I would happily volunteer my time just to learn from him. He told me to come back once I was "*healthy*" and he would gladly accept my offer of free labor in exchange for his tutelage. And so began a mentorship that meant the world to me. I could go on writing and fill numerous pages with anecdotes and stories of my time at the Museum, first as a volunteer and later as a paid curatorial assistant, but this is the SCAMIT NL and the issues have already gotten "too fat". Therefore, I want to mention the most important aspect of my experience working with Eric (besides all the cephalopod knowledge I was able to glean from him) and it was this – Eric was one of my first male scientist role models, and first male "boss", that treated me with dignity and made me feel like a scientist. Let me explain, (don't worry, I'm not going to get on an angry soap box), it was still not a great time to be a woman in science in the late 80's/early 90's. Especially not a young, blonde, newly graduated woman in science. I had dealt with many professors and scientists that symbolically patted me on the head with an attitude of "aww how cute, this little girl wants to be scientist", and other attitudes that were even less pleasant and that I won't describe here. Dr. Hochberg never, not once, not for a split second, ever treated me with anything less than respect and was always encouraging my ideas and pushing me to better myself and to pursue

my interests. Quite simply, he believed in me and accordingly, I started to believe in myself. So, whenever my career would falter and I felt like a failure, I would remember that Eric believed in me and in my intelligence and capabilities and I would dust myself off, hold my head up, and keep going. I often wonder what would have happened to me if I hadn't met Eric right out of college. Would my path have been different? I would assume so. I tried to tell him, many times, how much he meant to me, but in typical Eric fashion, he always downplayed his role and instead complimented my determination. The world needs more Dr. Hochbergs and I'm still so heart-broken that he is gone. But he lives on every time I see an octopus and am delighted and captivated beyond measure. Out of the species named for him I believe *Cirroctopus hochbergi* O'Shea 1999, has to be my favorite. I know he loved it too.

Beth Horvath: (31 May 2023)
"Dear SCAMIT friends: Not sure if you have heard, but Eric passed away today after struggling with a somewhat long and debilitating muscular disease. Eric was an amazing and multi-talented individual who I came to know and love from my time as a volunteer in my undergraduate years to my time as a graduate student in the late 70's to his oh-so-subtle 'arm-twisting,' getting me to plunge into the realm of Gorgonian Corals in 2002. I will never forget his suggesting to me that working on the museum's gorgonian collection would be a nice 4-month sabbatical project and never once told me that only 3 weeks into that sabbatical that nearly the entire Cnidarian collection from the Allan Hancock Foundation would be appearing in the SBMNH's Invertebrate Zoology Lab. Imagine my surprise when I came into the lab one morning and found the halls FILLED with boxes of cnidarian specimens collected by the *Velero* Expeditions. Hundreds of gorgonian samples mixed in with hydroids, jellies, sea pens, etc. SO MUCH for the 4-month sabbatical project, which has now become a many-year (about 20, to be exact) research endeavor!!

We worked together as naturalists on a Baja and Sea of Cortez *Searcher* cruise that the SBMNH sponsored some years ago and was a great time introducing one of his "nephews" to the marine realm; it is a trip full of good memories that I cherish. I am glad that his physical challenges were not so advanced at that point, so that he could do the things he loved doing, exploring the marine life of Baja.

He was a good friend, companion through my graduate years and early years of teaching, mentor, colleague, advisor and teacher. I will miss him; the cephalopod community has lost an important advocate, researcher and advisor. Hard to believe that he is gone, but I have to believe that he no longer is fettered by his physical struggles. He will be missed but has earned the respect of many and that will carry on for years to come."

Gretchen Lambert (1 June 2023):
"I am so saddened by this news. Eric was a good friend for so many decades. One memory I am happy to share is from 2004. Charley had retired from Cal State Fullerton and we'd moved to Seattle in 1998 but I kept in touch with Eric periodically. He wrote or called us in fall 2004, said he was driving up to Bellingham (WA) to look over a huge collection of bryozoans being donated to the SBMNH by a bryo expert who had recently retired from Western WA State in Bellingham, I forget her name but I'm sure many of you know who I am referring to. Eric said he wanted to stop by to see us which we were delighted about. We invited him for dinner and definitely to stay overnight. While showing him around the house we pointed out my "lab", a repurposed upstairs bedroom with microscope and many boxes of ascidians. I said there were boxes in the garage, boxes everywhere, and I just did not know what I was going to do with them. He looked at me,

smiled, with a twinkle in his eyes, and in his capacity as longtime curator of marine invertebrates at SBMNH said he knew exactly what I should do with them--donate them to the museum!! Well, of course! He said they currently had only a small collection, most of it unidentified. Would I consider not only donating my collection (most of it from the U.S. west coast San Diego to Alaska so very relevant for the museum) and staying in Santa Barbara long enough to work up their collection? The next Tunicata meeting was already scheduled at UCSB for July 2005, so Charley found a colleague to work with in her lab at UCSB for a month, we found a faculty member and family who would be at Woods Hole mid June to mid July (teaching at MBL) and needed someone to take care of their house and 2 dogs and a cat, we loaded the station wagon with all those boxes of ascidians and off we went for a fabulous month in Santa Barbara. All thanks to Eric. We enjoyed seeing him often during that month, me especially since I had space in the museum with an excellent microscope. And my ascidians tripled their collection.

One of Eric's specialties was nature printing; his creations were so beautiful. He enjoyed making many trips to Japan where he learned the art of gyutaku, fish printing. He was president of the Nature Printing Soc. for various periods of time, and one year their annual meeting and week-long workshop was held at the UW Friday Harbor Labs, with classes taught by experts from around the country and a gyutaku master Eric invited from Japan. I participated in some of the classes, learned a huge amount and helped out as step-&-fetch-it for everyone since it was in Sept. with the labs mostly empty.

We also always enjoyed our visits with Eric during the various Western Soc. of Naturalists meetings. And we stayed with him at his beautiful home several times. I will miss him."

Eric Hochberg – Renaissance Man
Adapted by Paul Valentich-Scott from an article published in the Santa Barbara Independent on 27 April 2012.

Dr. Fredrick G. Hochberg (Eric) earned both his undergraduate (1965) and Ph.D. (1971) from the University of California, Santa Barbara. While in school, his fascination with marine and terrestrial animals was nourished while traveling the world and experiencing unique diving opportunities. For example, in 1970, as a grad student he participated in the TEKTITE program as an Aquanaut and lived underwater for three weeks off the Virgin Islands in the Caribbean Sea.

A world-renowned expert on cephalopods, Dr. Hochberg was actively involved in research on a diversity of marine and terrestrial invertebrates, in particular the taxonomy and biology of

cephalopods and their parasites. He established a method for identifying closely related species of octopuses by studying the parasites that live in their kidneys, which was a great boon to world fisheries that depend on the health and populations of these animals. In 1999, Dr. Hochberg was appointed to the California Squid Scientific Research Committee to help oversee California's squid fishery. This Committee provides scientific oversight for the development of research protocols and the preparation and review of conservation and management plans for the important California cephalopod resource: *Doryteuthis opalescens*.

Dr. Hochberg co-founded and served as the past President of the Cephalopod International Advisory Council, a prestigious organization of scientists who provide advice on a variety of cephalopod-related issues from research to world fishing trends. He presided over the organization's 1997 triennial meeting in Cape Town South Africa. When the Museum hosted the annual meeting of the American Malacological Union in Santa Barbara in 1998, Eric organized a major international symposium on "Cephalopods of the North Pacific Ocean" and a subsequent week-long international workshop on cephalopod taxonomy held in the Museum's Department of Invertebrate Zoology.

Dr. Hochberg's passion for science and nature was also expressed in his creative work as an internationally recognized printmaker and artist. Eric was one of the co-founders of the Nature Printing Society.

Over the course of his work at the Museum, Dr. Hochberg named 30 new species and seven new genera, and he had a number of marine and terrestrial animals named in his honor. Eric will be remembered with respect, admiration and great fondness.

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ARTHROPOD PERSONALS – SEEKING COMPANION? BY D. CADIEN

Don has created a wonderful ten-part series on various crustacea ecology and life history. We are lucky to have such a knowledgeable and humorous science writer in our midst! Below is part I in the series. Enjoy!

Pt. 1 – I'm a Cancer, what's your sign? - DB Cadien, WWRF, Los Angeles County Sanitation Districts, 31Dec23

The phylum Arthropoda contains more species than any other, contributing more to the diversity of the Earth's biome than all other phyla combined (Zhang et al 2011). Most of this dominance is terrestrial, where insects are hugely diverse relative to other forms of life (Stork 2018), but also applies to the ocean. The exceptional diversity of terrestrial arthropods is hinted at (though not directly stated) in this footnote: "There is a story, possibly apocryphal. Of the distinguished British biologist J. B. S. Haldane, who found himself in the company of a group of theologians. On being asked what one could conclude as to the nature of the Creator from a study of his creation, Haldane is said to have answered, 'An inordinate fondness for beetles' (Hutchinson 1959). The group is also quite ancient, having appeared in

A smattering of the morphological variety within marine Arthropoda
Included groups are leptostracans, tanaids, cumaceans, amphipods and decapods
Together these contribute only a fraction of the total marine arthropod diversity

the Cambrian about ½ billion years ago (Gould 1989, Conway Morris 1998). That enormous length of time has allowed them to diverge greatly on both the land and in the sea. While they did so they formed associations with other species; sometimes other arthropods, sometimes members of other groups.

This long evolution could not have occurred without symbiosis – the living together of separate forms. Indeed, the most probable explanation of the existence of the eukaryotic cell is symbiosis at the cellular level (Margulis and Bermudes 1985). Relationships between two (or more) members of such a group – the symbionts, vary. A conceptual division into three types is usual (Leung and Poulin 2008): parasitism, commensalism, and mutualism. What separates the types is the balance (or lack thereof) of benefit to the participants. In parasitism it is nearly one-sided, with

all or nearly all benefit accruing to the parasite, and little or none to the host. In commensalism, one or more of the participants benefits, with one or more are unaffected either positively or negatively. In mutualism benefit is distributed among the partners more or less equitably, with benefits for all participants. While all participants are symbionts, there is normally a division into hosts and 'symbionts'. Hosts are typically much larger than their 'symbionts', and are more likely to be negatively affected by the interaction. The partners can be loosely associated, living together in a common area such as a burrow or tube (association of the first type, not involving physical contact of the participants). An example of this is the symbiosis between bottom dwelling gobies, and alpheid shrimps (Hararda 1969, Karplus 1992, Karplus and Thompson 2011). The shrimp constructs the burrow and allows the fish to also occupy it. The goby may alert the shrimp to approaching danger and may also provide nutrients for the shrimp (Kohda et al 2017). Such interactions may be casual and easily abandoned, or obligatory. Both parties benefit; thus an example of mutualism.

First Type of relationship – close association: here in a common burrow constructed by the shrimp
In this case a mutualism (image from https://www.liveaquaria.com/article/201/?aid=201)

In addition to close association as shown above, the symbionts may also be physically attached to one another in an ectosymbiosis, or mutually occupy the host body in an endosymbiosis.

Second type of relationship: The juvenile (praniza stage) of a gnathiid isopod feeding on a fish: an ectosymbiosis, and example of parasitism (from Grutter et al 2017)

Ectosymbionts frequently can intentionally detach or be detached from the host, although as they are usually attached via mouthparts or other tenacious grasping tools (such as strong dactyls), host damage is

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likely to result. The ectosymbiosis of the gnathiid praniza is temporary, and the ectosymbiont detaches after it has finished its blood meal on the host, to rest on the sea-floor and prepare for metamorphosis to the next stage of its polymorphic life. This is clearly a case of parasitism, as the fish receives only injury while the symbiont receives nutrition.

Endosymbionts are often so modified for residence within the host body that they are not recognizable as arthropods. Such is the case with the Ascothoracica (see Grygier 1982), which typically inhabit the bodies of echinoderms. They were only recognized as belonging to the phylum Arthropoda through their larval stages, which bore tell-tale legs. This is also a clear case of parasitism, with the endosymbiont benefitting from housing and food, while the host is drained of energy and damaged, and usually also prevented from reproducing.

Third type of relationship:Adult of the endosymbiont ascothoracid barnacle *Dendrogaster* removed from its echinoderm host (photo: Gustav Paulay, Florida Museum of Natural History)

There is also a series of other barnacles, the rhizocephalans, that both inhabit the body of the host as endosymbionts and exhibit external manifestations on the host (typically reproductive). These, since the main portion of the symbiont body is inside the host, are also treated as endosymbionts.

Commensalism, where one party benefits, while the other remains unaffected can be seen in the relationship between polynoid scaleworms and the starfishes whose pedal grooves they live and feed in. There is no apparent harm to the starfish, and presence of one or several worms seems not to adversely affect the larger host, while the symbionts benefit greatly from protection and the ability to scavenge food unused by the echinoderm.

Such interactions are generally of considerable interest to biologists, and there is a large and growing literature concerning them. Symbiotic relationships with various marine arthropods will be explored in a series of articles all based on a trivial but intriguing question: What might one find on the Personals page of a paper produced by and for arthropods?

Polynoid commensal *Arctonoe fragilis* in the pedal groove of the sea star *Evasterias troscheli* (photo Dave Cowies)

LITERATURE CITED

Coan, E., P. Valentich-Scott, and F.R. Bernard. 2000. Bivalve seashells of western North America: Marine Bivalve Mollusks from arctic Alaska to Baja California. Santa Barbara Museum of Natural History, Santa Barbara, California. 764 pp.

Conway Morris, S. (1998). The Crucible of Creation - the Burgess Shale and the rise of animals. Oxford, England, Oxford University Press.

Fisher, Walter K. 1911. Asteroidea of the North Pacific and adjacent waters. Part I. Phanerozonia and Spinulosa. United States National Museum Bulletin 76:1-419.

Gould, S. J. (1989). Wonderful Life - The Burgess Shale and the Nature of History. New York, New York, U.S.A., W. W. Norton & Company.

Grutter, A. S., S. P. Blomberg, B. Fargher, A. M. Kuris, M. I. McCormick and R. R. Warner (2017`). "Size-related mortality due to gnathiid isopod micropredation correlates with settlement size in coral reef fishes." Coral Reefs 36(2): 549-559.

Grygier, M. J. (1982). "*Dendrogaster* (Crustacea: Ascothoracida) from California; sea-star parasites collected by the 'Albatross'." Proceedings of the California Academy of Sciences 42(18): 443-454.

Harada, E. (1969). "On the interspecific association of a snapping shrimp and gobioid fishes." Publications of the Seto Marine Biological Laboratory 16(5): 315-334.

Hutchinson, G. E. (1959). "Homage to Santa Rosalia or Why are There So Many Kinds of Animals?" The American Naturalist 93(870): 145-159.

Karplus, I. (1992). "Obligatory and facultative goby-shrimp partnerships in the Western Tropical Atlantic." Symbiosis 12: 275-291.

Karplus, I. and A. R. Thompson (2011). The partnership between gobiid fishes and burrowing alpheid shrimps. The Biology of Gobies. R. A. Patzner, J. L. Van Tassell, M. Kovačić and B. G. Kapoor (eds.). Boca Raton, Florida, USA, CRC Press: 559-607.

Kohda, M., H. Yamanuchi, T. Hirata, S. Satoh and K. Ota (2017). "A novel aspect of goby-shrimp symbiosis: gobies provide droppings in their burrows as vital food for their partner shrimps." Marine Biology 164(22): 7pp.

Leung, T. L. F. and R. Poulin (2008). "Parasitism, commensalism, and mutualism: exploring the many shades of symbioses." Vie et Milieu 59: 107-115.

Ludwig, H. 1905. Asteroidea. In Reports on an Exploration off the West Coasts of Mexico, Central and South America, and off the Galapagos Islands, in Charge of Alexander Agassiz, by the U.S. Fish Commission Steamer "Albatross," during 1891, Lieut. Commander ZL. Tanner, U.S.N., Commanding. And Reports on the Scientific Results of the Expedition to the Tropical Pacific, in Charge of Alexander Agassiz, on the U.S. Fish Commission Steamer "Albatross," from August, 1899, to March, 1900, Commander Jefferson F. Moser, U.S.N.. Commanding. Memoirs of the Museum of Comparative Zoology at Harvard College, 32:1-292, 35 plates, 1 chart.

Margulis, L. and D. Bermudes (1985). "Symbiosis as a mechanism of evolution: status of cell symbiosis theory." Symbiosis 1: 101-124.

Stork, N. F. (2018). "How many species of insects and other terrestrial arthropods are there on Earth?" Annual Review of Entomology 61: 31-45.

Zhang, Z.-Q. (2011). "Animal Biodiversity: an introduction to higher-level classification and taxonomic richness." Zootaxa (3148): 7-12.

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